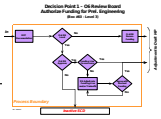
SHIPMAIN

An Overview of the SHIPMAIN Maintenance and Alterations Planning Process

Core Leaders

Alts & MODs Process Map 03Jun 04



Fleet
- CFFC
- TYCOM

OPNAV
- N6-N7
- Nxx

PEO
- SPM (Indluding PY)
- PARM

SYSCOMS
- PARM
- NAVSEA
- SPAWAR
- NAVAIR
- Technical Authority

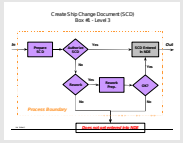
Com-ments

Idea

Complete Ship Change Document (SCD). This will be the single document that remains with an Ship Change (SC) throughout its development.

Minimum information level is equivalent to that required to support Acuisition Milestone A as defined in DOD 5000 series.

Concept Development level engineering is the responsibility of the submitting activity.



10

NDE

20

Tech Assess

Tech Assessment

30

AFOM

AFOM Process

AFOM and CBA are independent and executed in parallel.

40

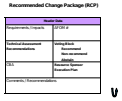
CBA

Independent Cost Review Team reviews cost estimates.

CBA Overview

RCP

Recommendated Change Package (RCP) is an executive summary document with recommendations.



Decision Point 1

60

Authorize Fund Prelim Engineering

Yes

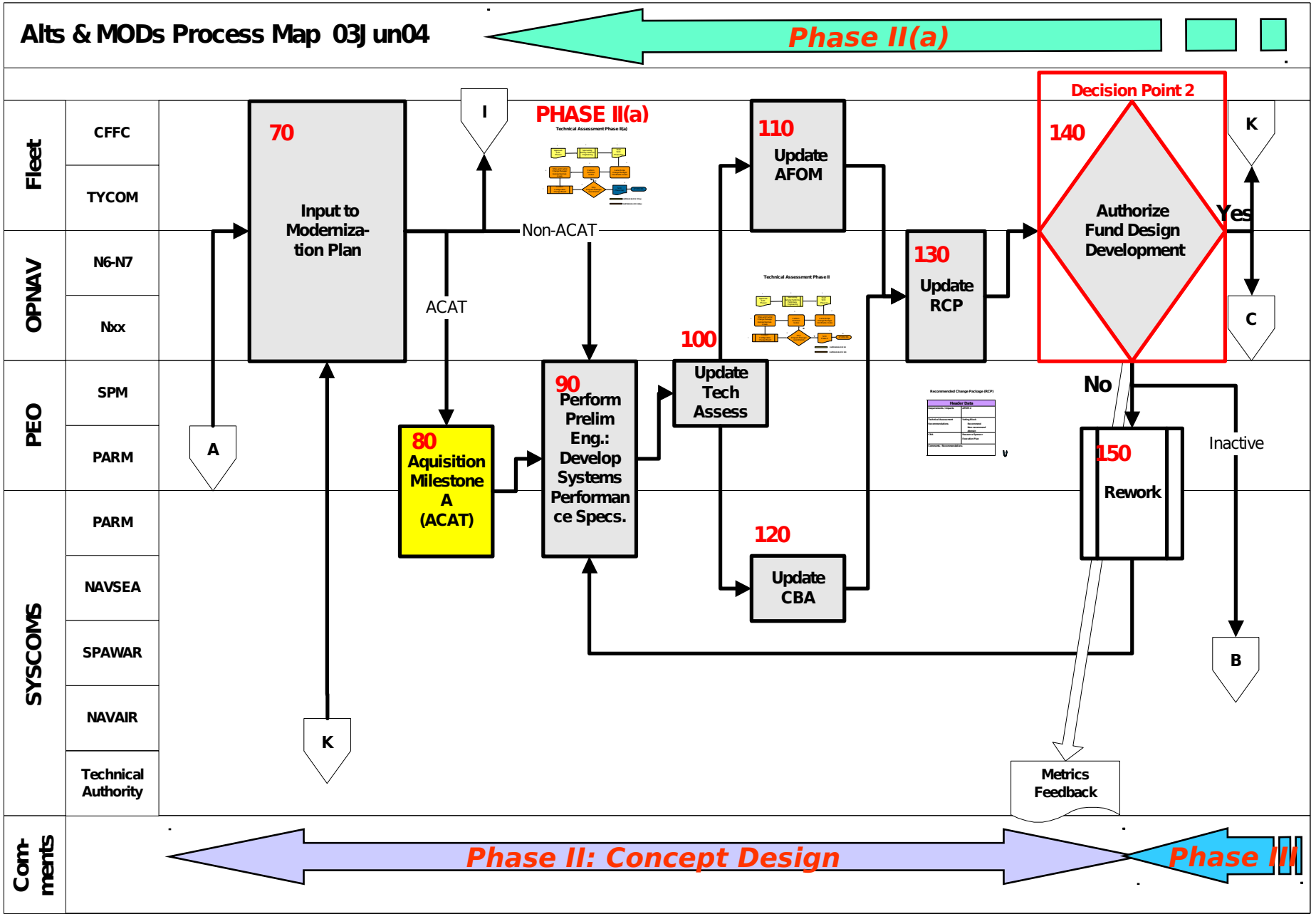
No

A

Inactive

B Inactive

Phase I: Preliminary Analysis


Alts & MODs Process Map 03Jun04
Phase II(a)
Fleet
CFFC
TYCOM
OPNAV
N6-N7
Nxx
PEO
SPM
PARM
SYSCOMS
PARM
NAVSEA
SPAWAR
NAVAIR
Technical Authority
Com-ments
70
Input to Modernization Plan
I
PHASE II(a)
Non-ACAT
ACAT
110
Update AFOM
130
Update RCP
Decision Point 2
140
Authorize Fund Design Development
Yes
K
C
No
Inactive
100
Update Tech Assess
90
Perform Prelim Eng.: Develop Systems Performance Specs.
80
Aquisition Milestone A (ACAT)
A
K
120
Update CBA
150
Rework
B
Metrics Feedback
Phase II: Concept Design
Phase III

Alts & MODs Process Map 03Jun04

Phase II(a)

Phase II(a) - Continuation

Return from decision not to make installs after initial

Decision Point 3

Update MP

Fleet: CFFC, TYCOM

OPNAV: N6-N7, Nxx

PEO: SPM, PARM

SYSCOMS: PARM, NAVSEA, SPAWAR, NAVAIR, Technical Authority

Comments

I

F

K

C

B

D

190 Update AFOM

210 Update RCP

220 Fund Procurement & Installation

Yes

No

ACAT

Non ACAT

180 Update Tech Assess

170 Design / Develop: Create System - Product Detail Specs

160 Aquisition Milestone B (ACAT)

200 Update CBA

230 Rework

Inactive

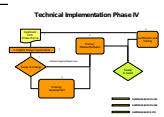
240 Acquisition Millestone C (ACAT)

Engineering Spec: design/material, Info to produce drawings, Class integration requirements, Engineering design model.

Phase III: Design Develop

Phase IV: Ship Integration

Alts & MODs Process Map 03Jun04



Fleet
CFFC
TYCOM
OPNAV
N6-N7
Nxx
PEO
SPM
PARM
SYSCOMs
PARM
NAVSEA
SPAWAR
NAVAIR
Technical Authority
Com-ments

Authorize and issue LOA; Generate 2K

250 Headquaters centrally procured material (HCMP)

260 Technical Implementation PY Activity: Ship integration design by hull; Procure kitted material

270 SC Ready to Install

Yes

No

280 Install SC

290 Hotwash Feedback: Cost CM Performance Schedule ILS, etc.

300 Continue Installs

Yes

No

310 Final Install

No

Yes

320 Complete SC, including Feedback and Closeout

D

F

Return to third Hierarchical Decision Step

NDE

K

Update MP

Metrics Feedback

Metrics Feedback

Phase IV: Ship Integration

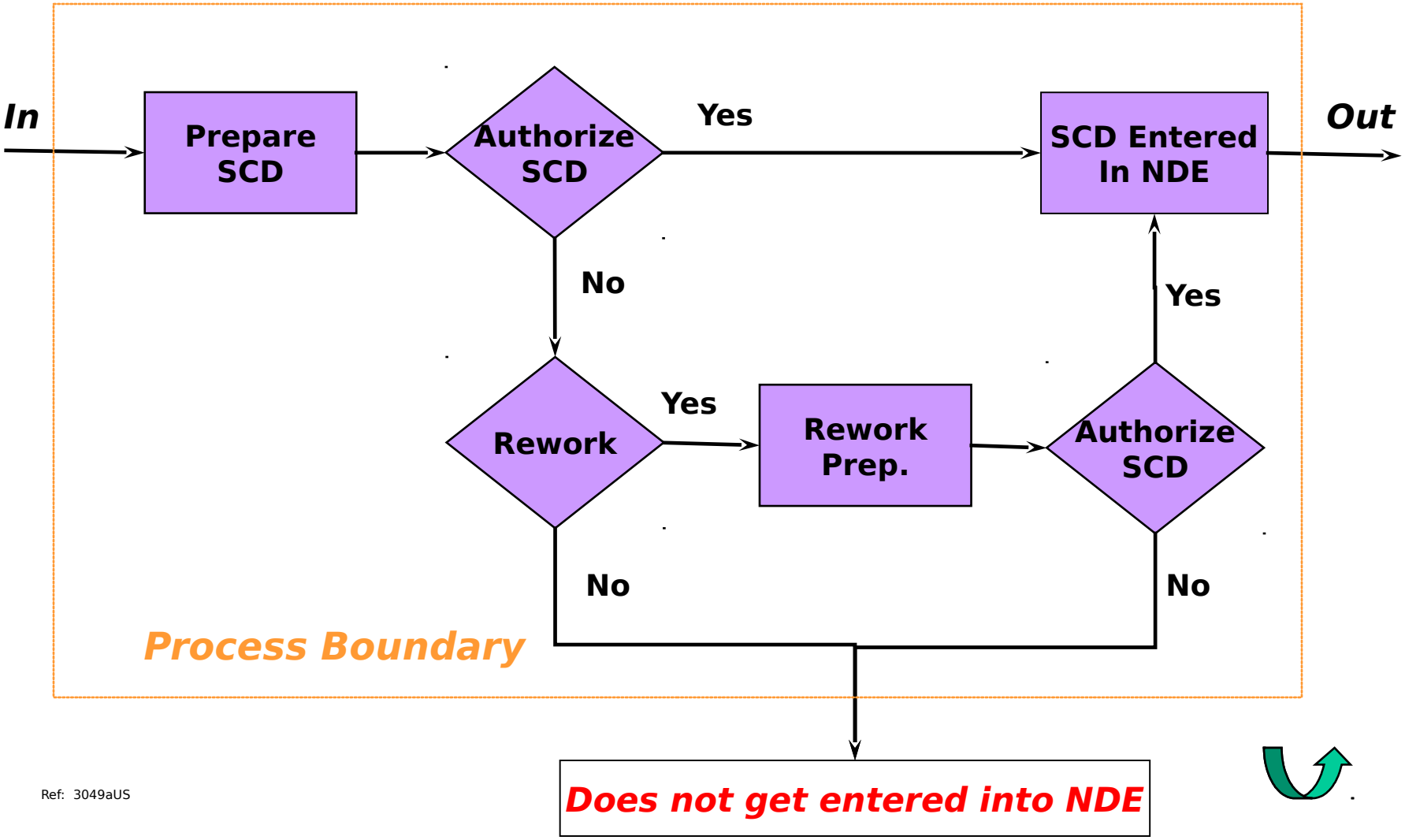
Installation and Testing

Voting Rules

Off Site Out-Brief

13 May, 04

Create Ship Change Document (SCD)
Box #10 - Level 3



Ref: 3049aUS

Recommended Change Package (RCP)

Header Data (DP 1)	
Requirements / Impacts	**AFOM #**
Technical Assessment **Recommendations**	**Voting Block** **Recommend** **Non-recommend** **Abstain**
CBA	**Resource Sponsor** **Execution Plan**
Comments / Recommendations	

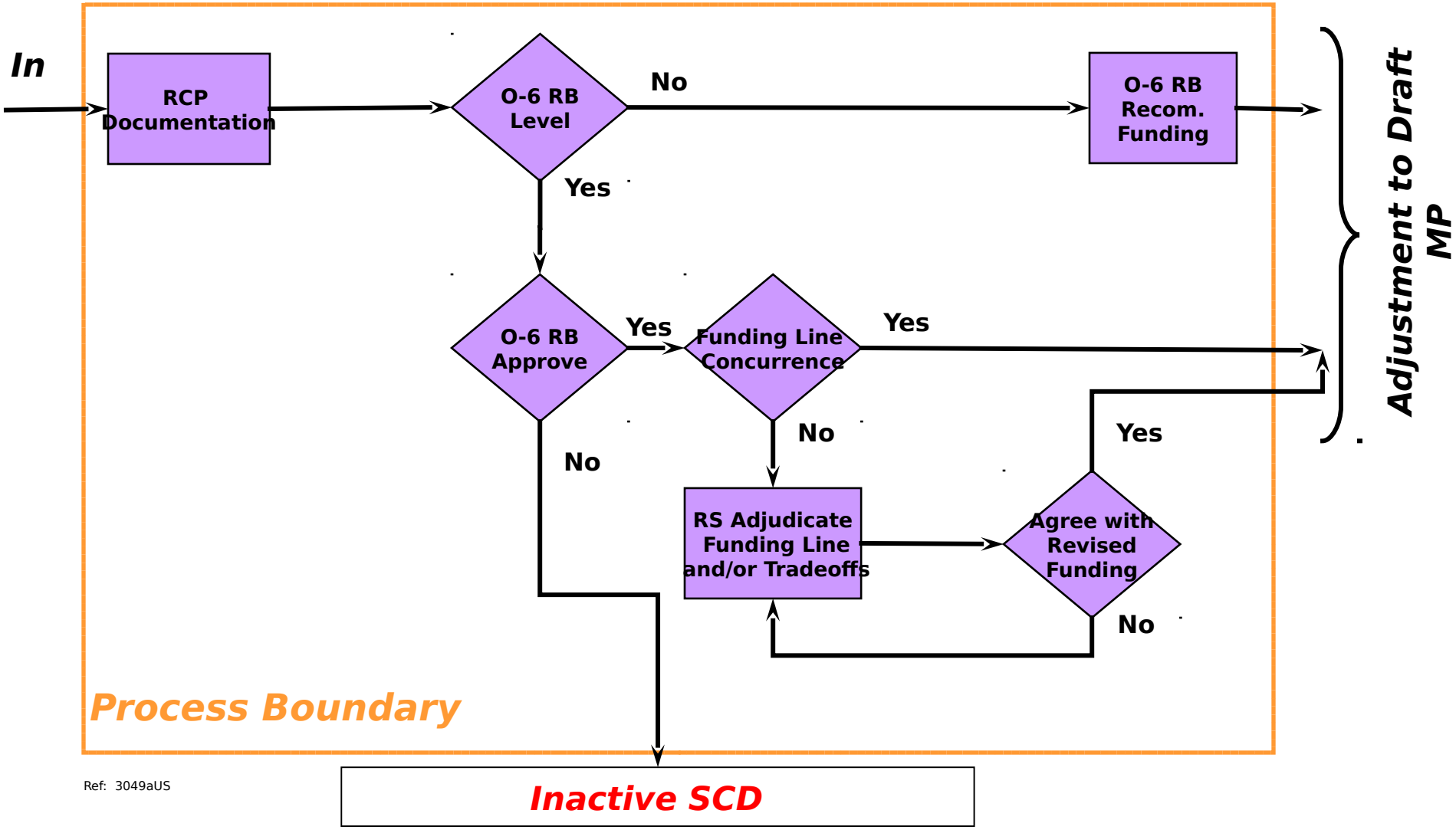
Recommended Change Package (RCP)

Header Data (DP 2)	
Requirements / Impacts	**AFOM #** **Updated AFOM#**
Technical Assessment **Recommendations**	**Voting Block** **Recommend** **Non-recommend** **Abstain**
CBA **Updated CBA**	**Resource Sponsor** **Execution Plan**
Comments / Recommendations	

Recommended Change Package (RCP)

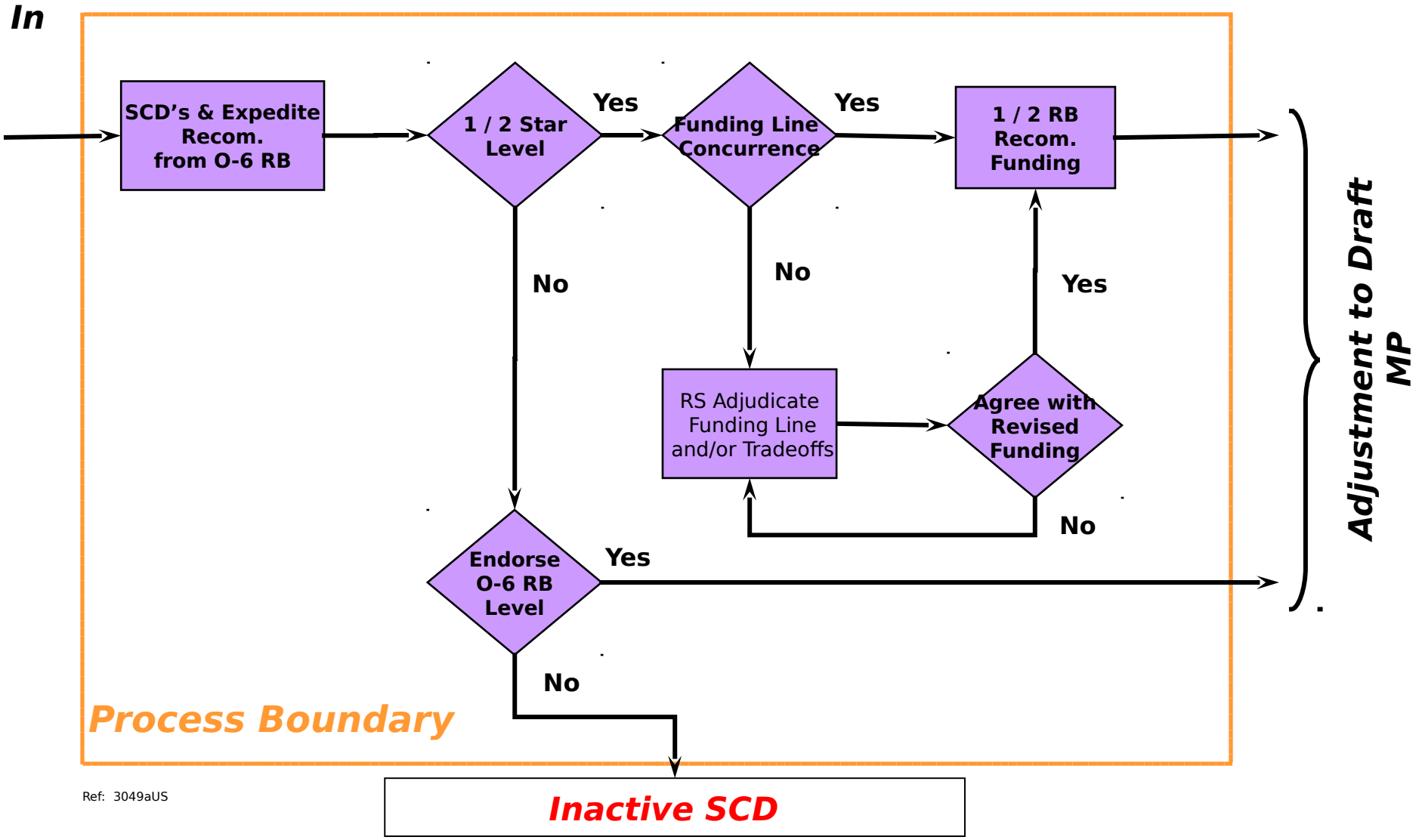
Header Data (DP 3)	
Requirements / Impacts	AFOM # DP 1 AFOM # DP 2 Updated AFOM#
Technical Assessment Recommendations	Voting Block Recommend Non-recommend Abstain
CBA DP 1 CBA DP 2 Updated CBA	Resource Sponsor Execution Plan
Comments / Recommendations	

Decision Point 1 – O6 Review Board
Authorize Funding for Prel. Engineering
(Box #60 - Level 3)



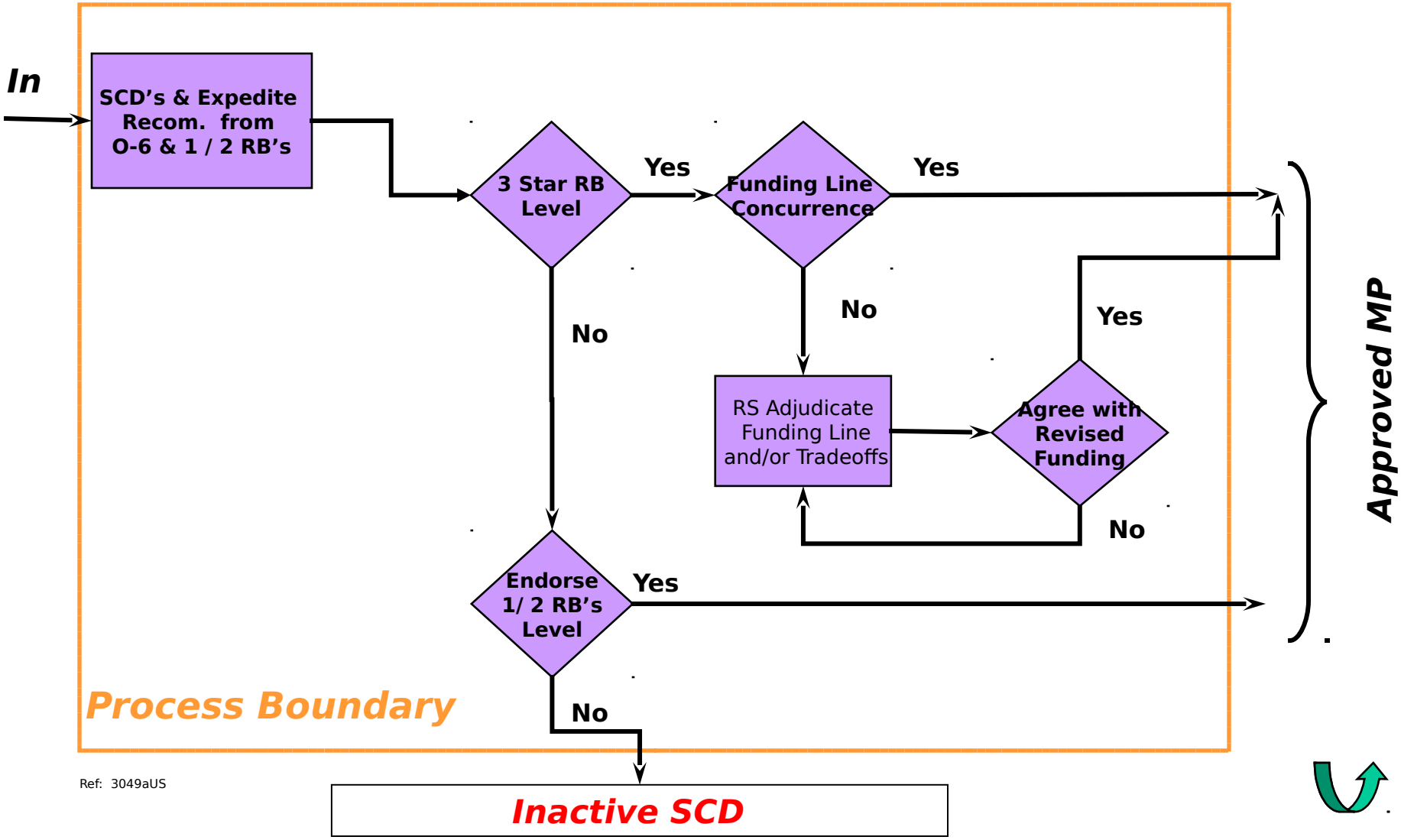
Ref: 3049aUS

Decision Point 1 – 1 / 2 Star Review Board
Authorize Funding for Prel. Engineering
(Box #60 - Level 3)



Ref: 3049aUS

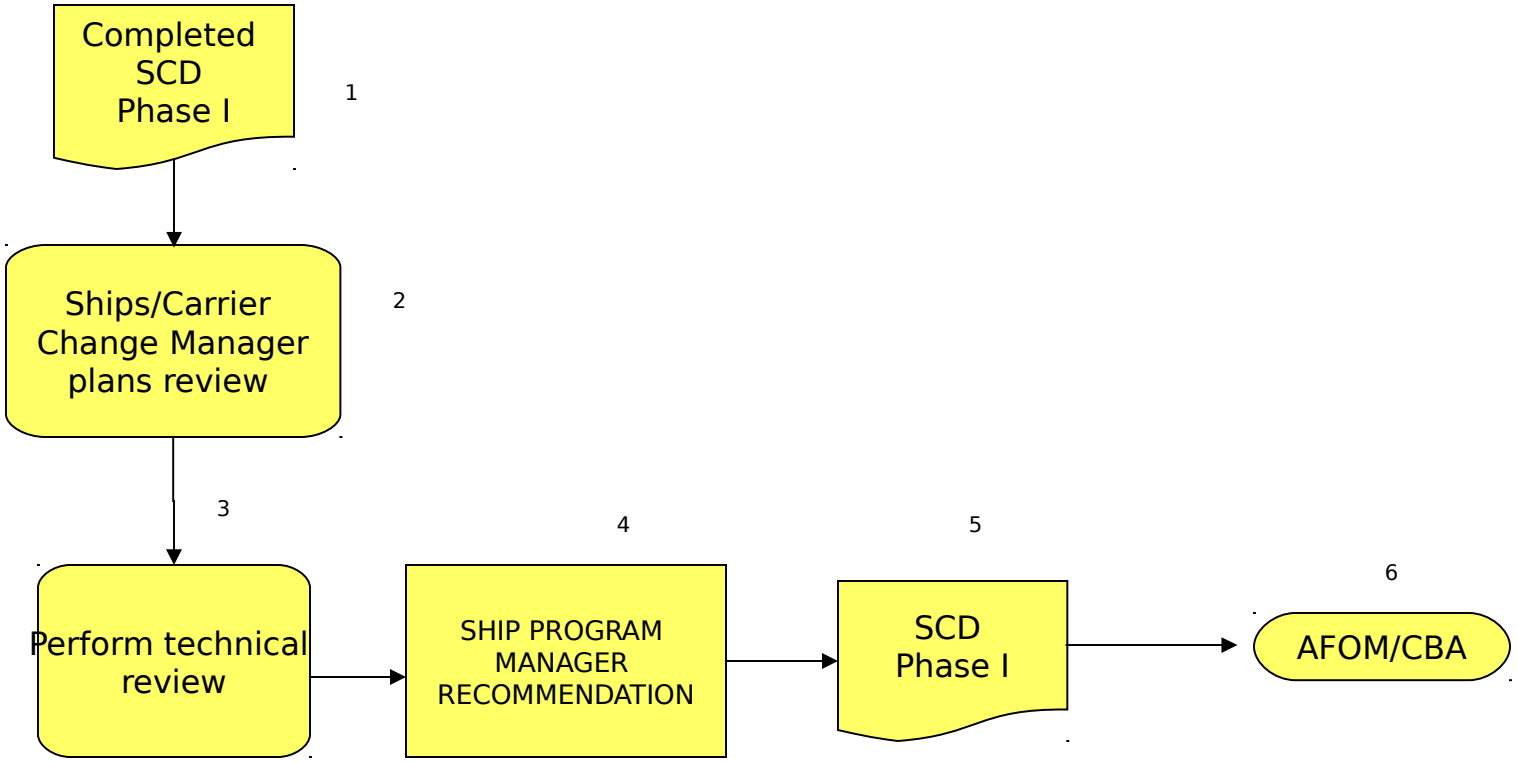
Decision Point 1 – 3 Star Review Board
Authorize Funding for Prel. Engineering
(Box #60 - Level 3)



Ref: 3049aUS

Tech Assessment

Technical Assessment Phase I



Phase II(a)

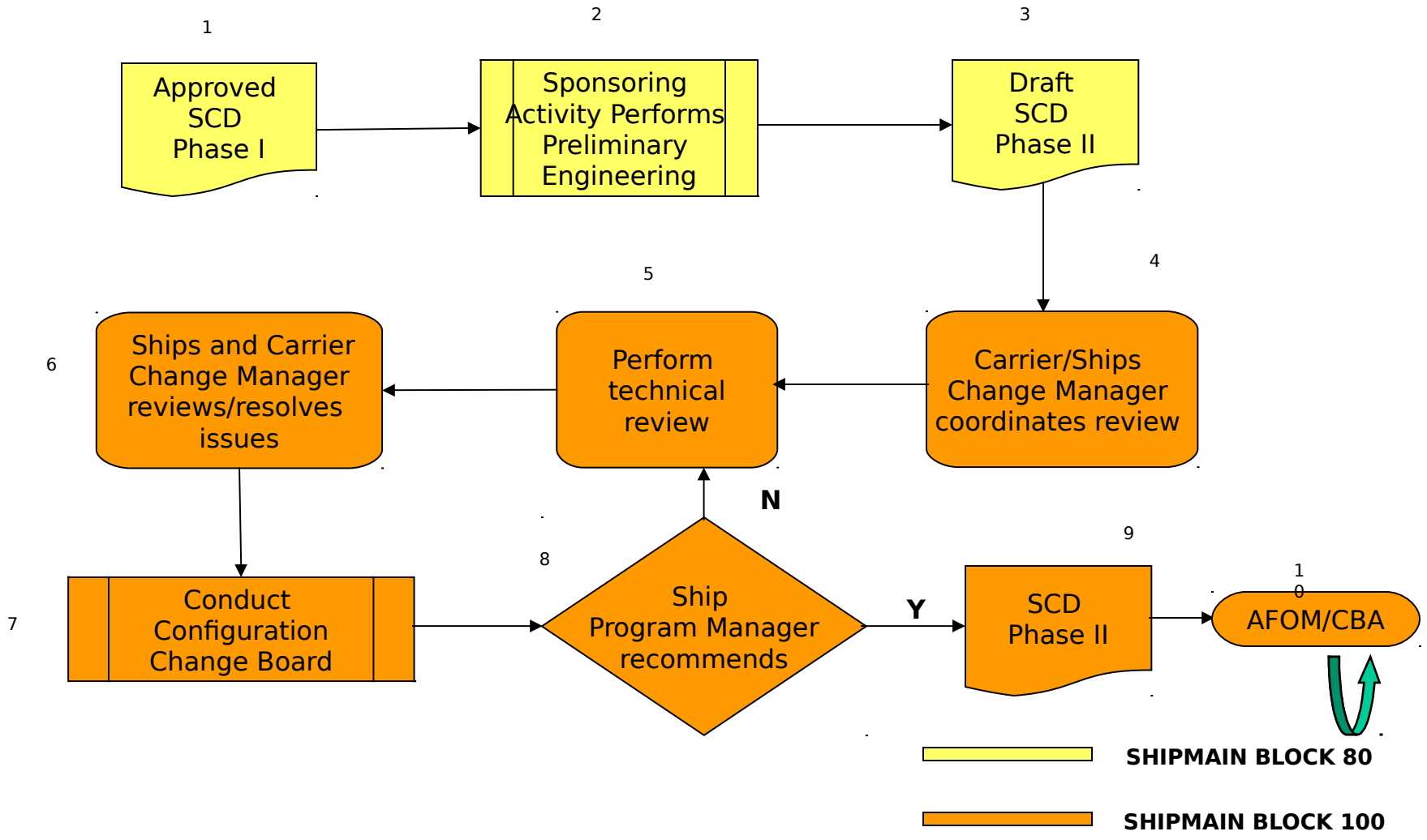
Phase II(a) - Guidelines

- **Guidelines for combining of phases II and III:**
  - **If the Scope is Internal Equipment Modification, all of the following criteria must be met:**
    - **The change can be accomplished without changing an interface external to the equipment or system**
    - **The change is made within the equipment or system**
    - **The change does not negatively impact Battle Force/Strike Force Interoperability**
    - **The change does not impact shipboard distributive systems, Ship Selected Records (SSRs) or interfacing equipment or systems, compartmental arrangement records; or Damage Control records.**

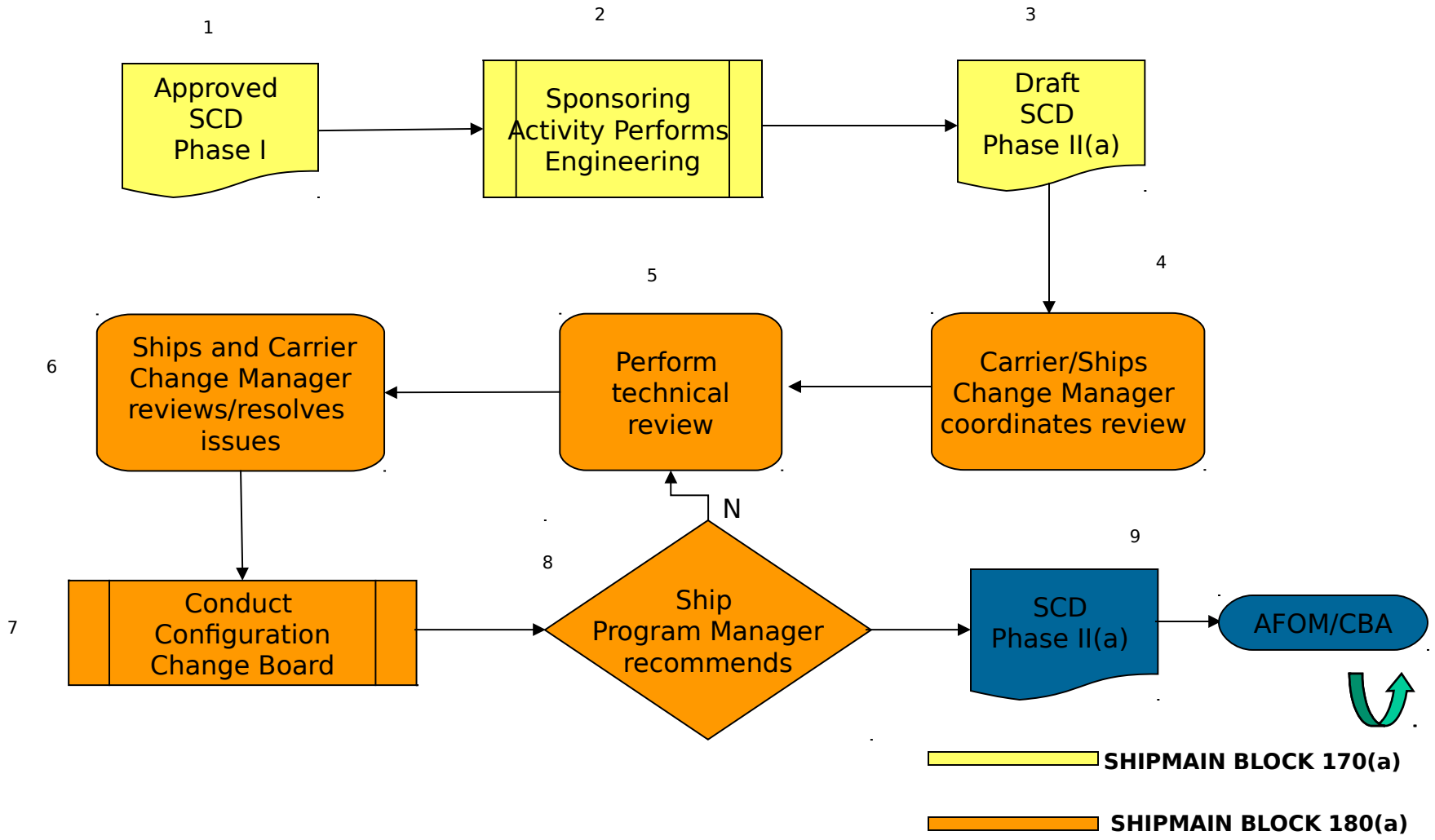
Phase II(a) – Guidelines (cont'd)

- **Guidelines for combining of phases II and III:**
  - **If the Scope is Ship Modification, all of the following criteria must be met:**
    - **The change does not negatively impact Battle Force/Strike Force Interoperability**
    - **The change does not impact ships stability records (weight & moment)**
    - **The change does not impact or alter the 3-dimensional footprint of the equipment being replaced**
    - **The change does not impact shipboard distributive systems, Ship Selected Records (SSRs) or interfacing equipment or systems, compartmental arrangement records; or Damage Control records**
    - **The change does not impact manning levels**

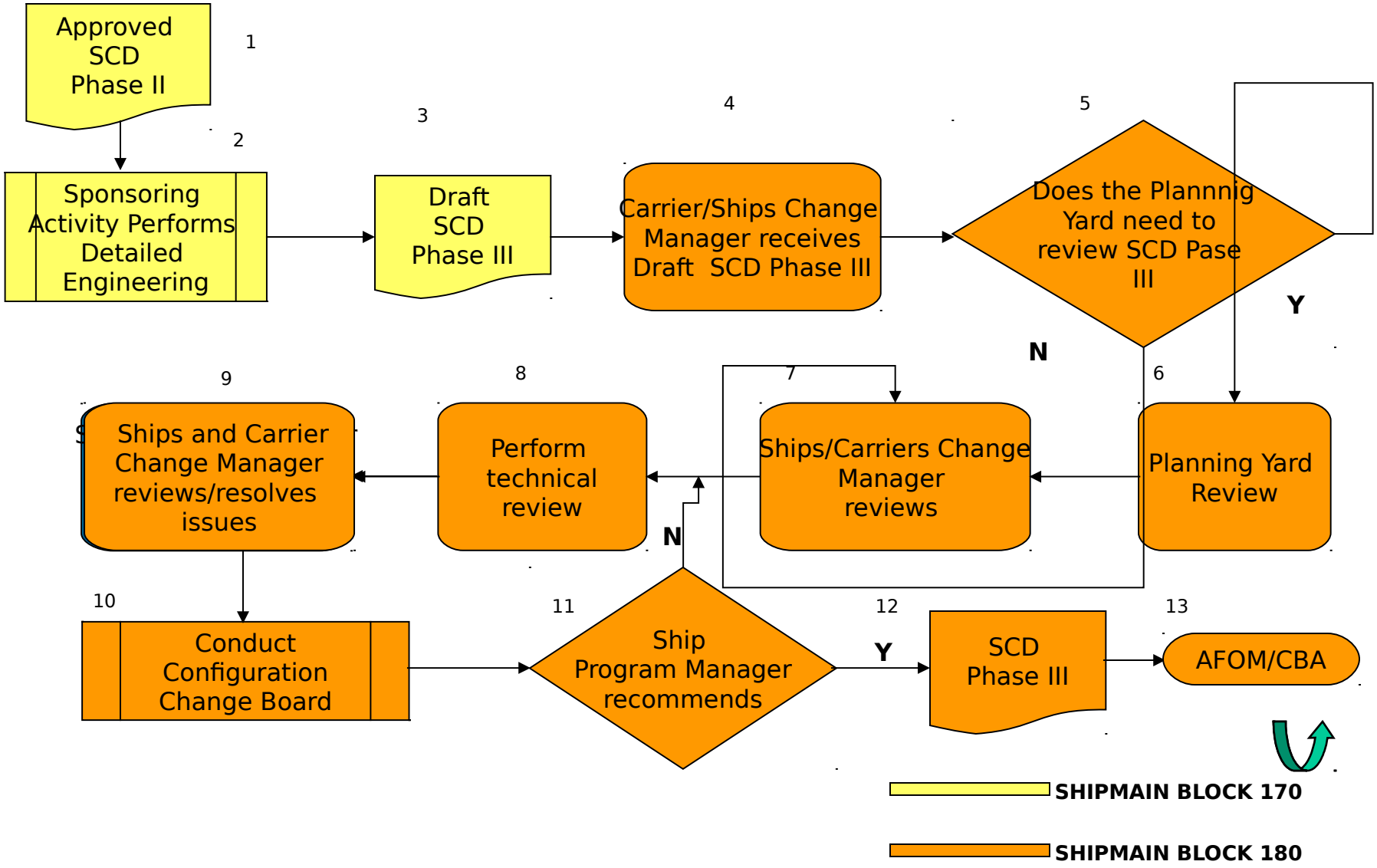
Technical Assessment Phase II



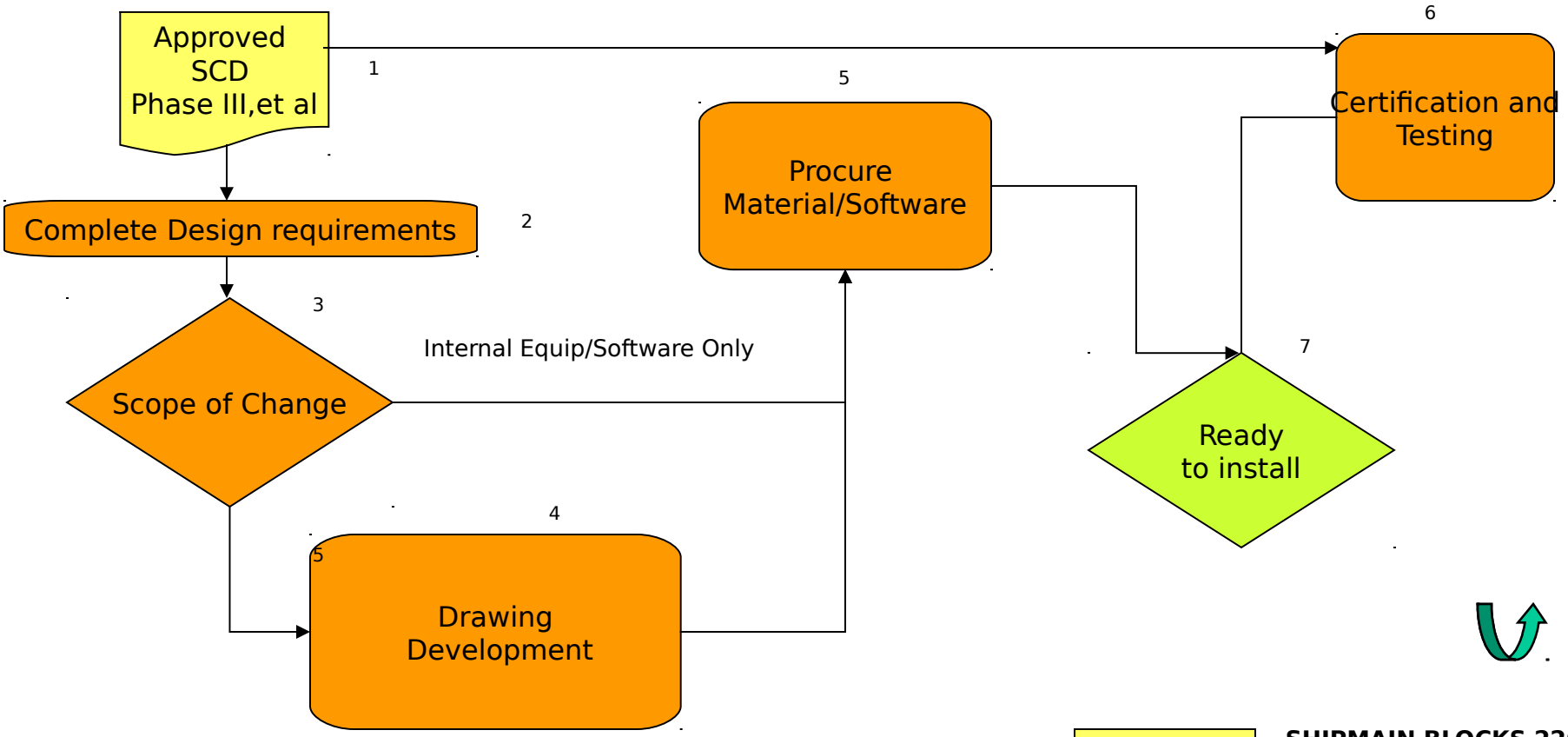
Technical Assessment Phase II(a)



Technical Assessment Phase III



Technical Implementation Phase IV

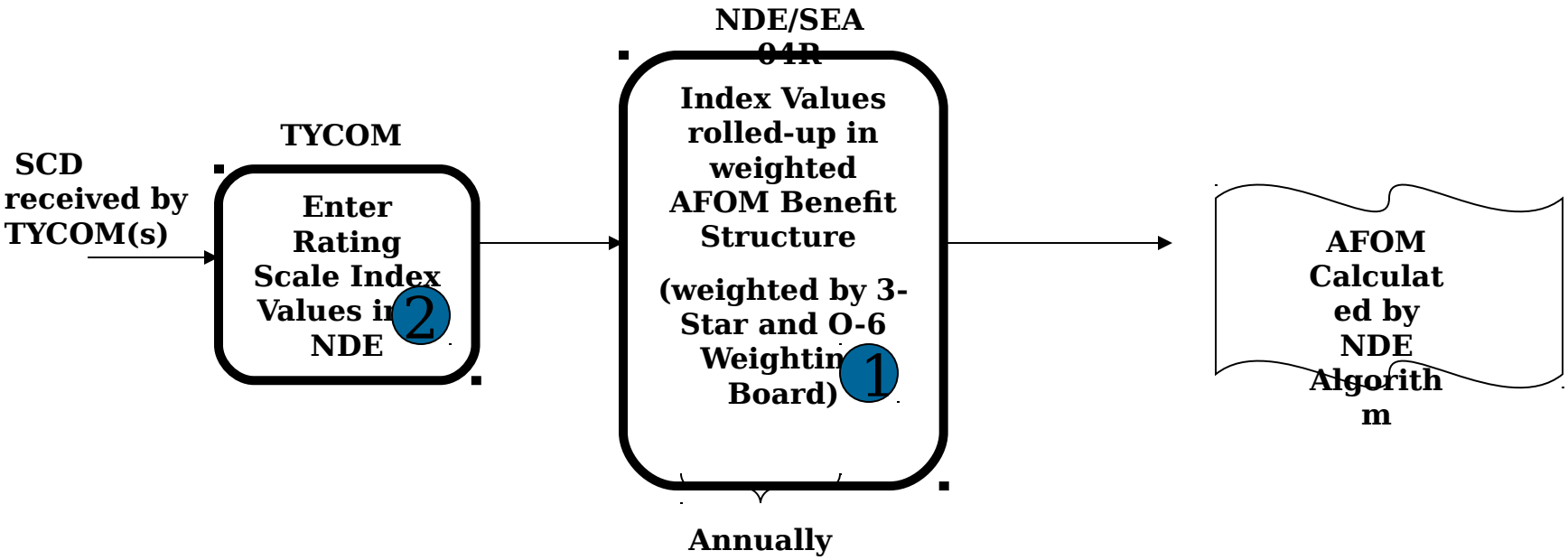


AFOM Process

Goal: Calculate a quantitative articulation of Warfighting and Readiness “Value Added” for each Ship Change

(Scale of 0-100)

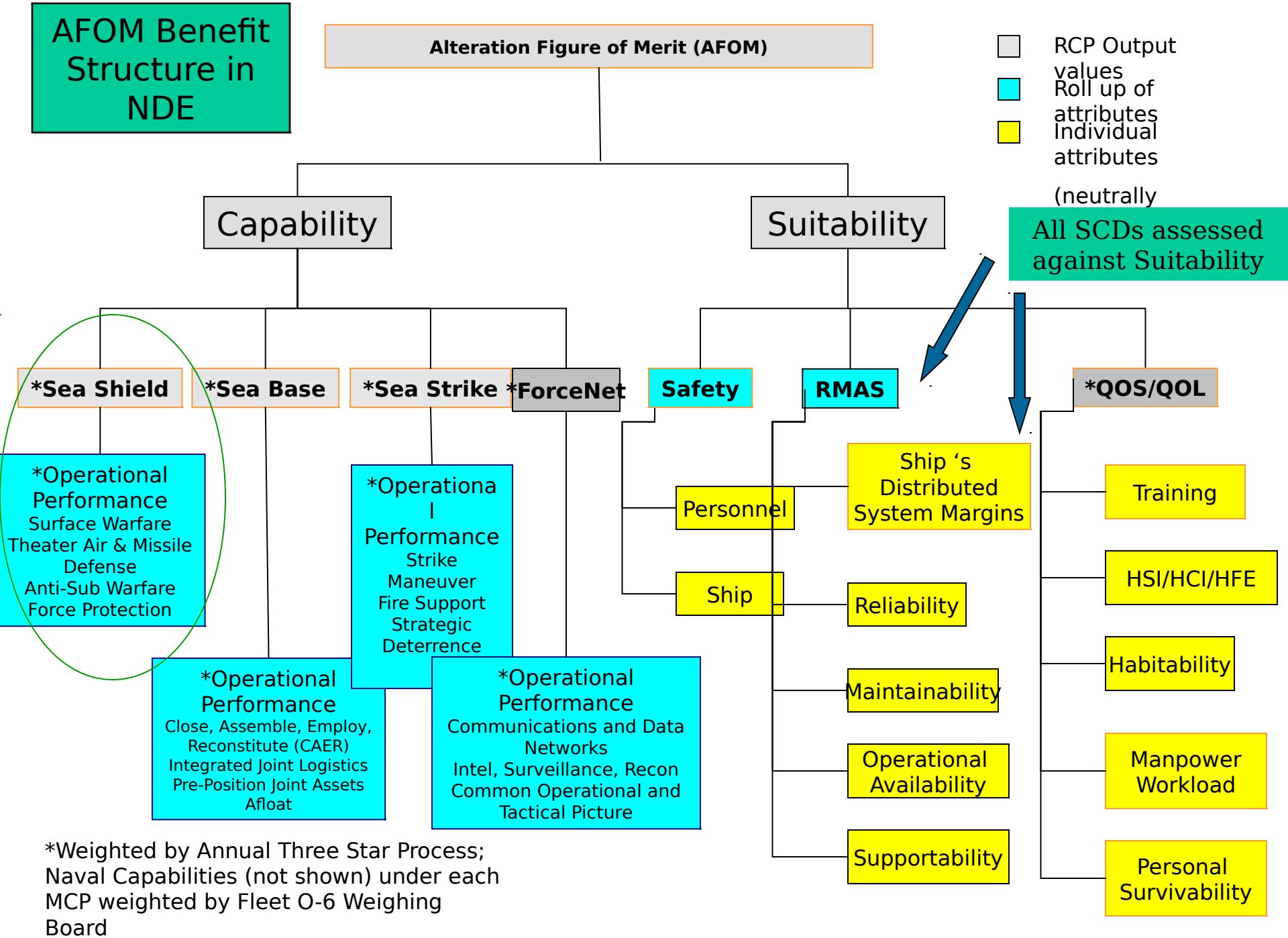
AFOM Process (Initial and Update)



Continuous SCDs X TYCOM Ratings X Navy Priorities (Weights) = AFOM Value

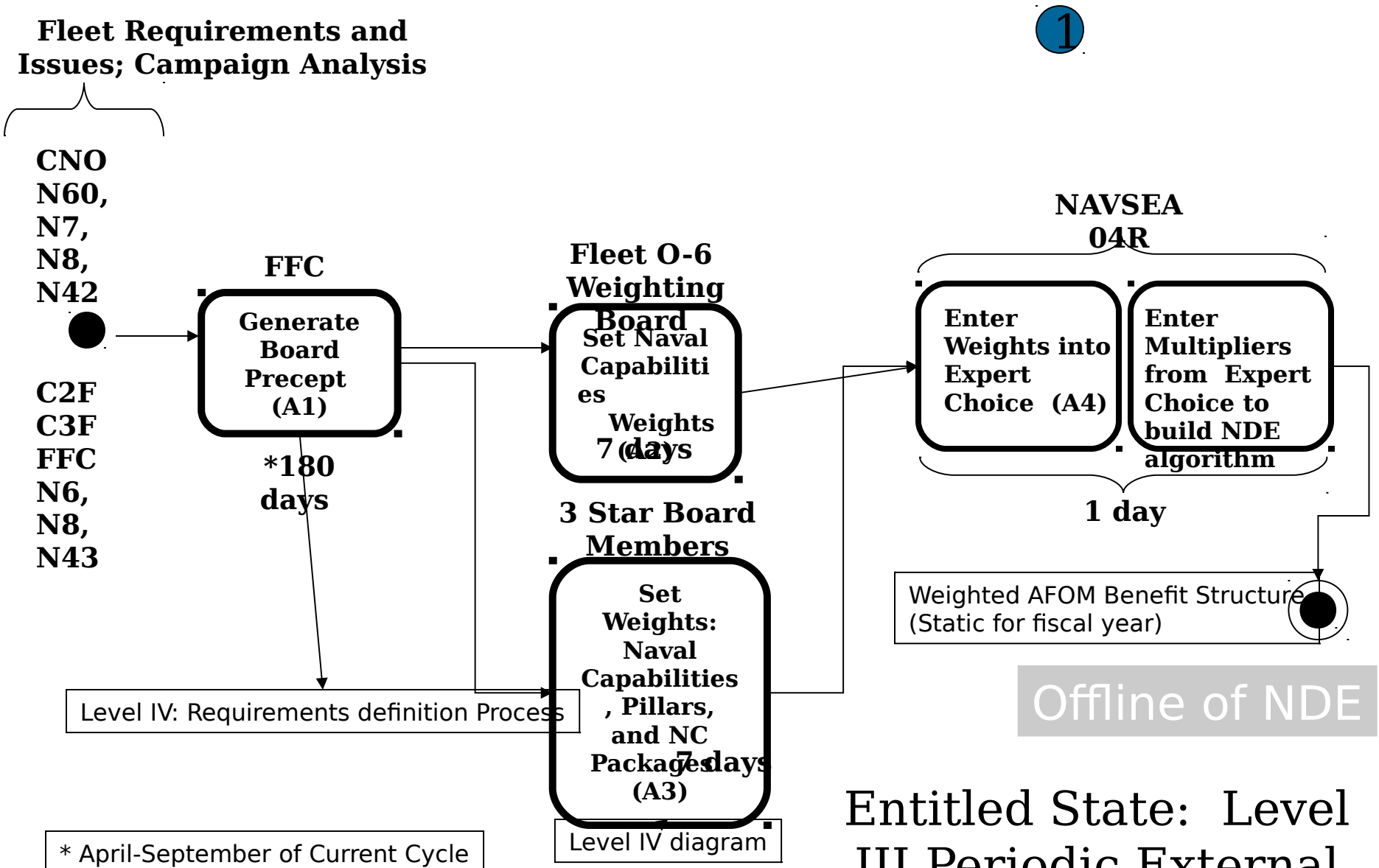
Annual AFOM Benefit Structure Weighting Process

AFOM Benefit Structure in NDE



*Weighted by Annual Three Star Process; Naval Capabilities (not shown) under each MCP weighted by Fleet O-6 Weighing Board

Development of AFOM Benefit Structure Weights (Annual)


Fleet Requirements and Issues; Campaign Analysis
1
CNO N60, N7, N8, N42
C2F C3F FFC N6, N8, N43
FFC
Generate Board Precept (A1)
*180 days
Fleet O-6 Weighting Board
Set Naval Capabilities Weights (A2)
7 days
NAVSEA 04R
Enter Weights into Expert Choice (A4)
Enter Multipliers from Expert Choice to build NDE algorithm
1 day
3 Star Board Members
Set Weights: Naval Capabilities, Pillars, and NC Packages (A3)
7 days
Level IV: Requirements definition Process
Weighted AFOM Benefit Structure (Static for fiscal year)
Offline of NDE
* April-September of Current Cycle
Level IV diagram

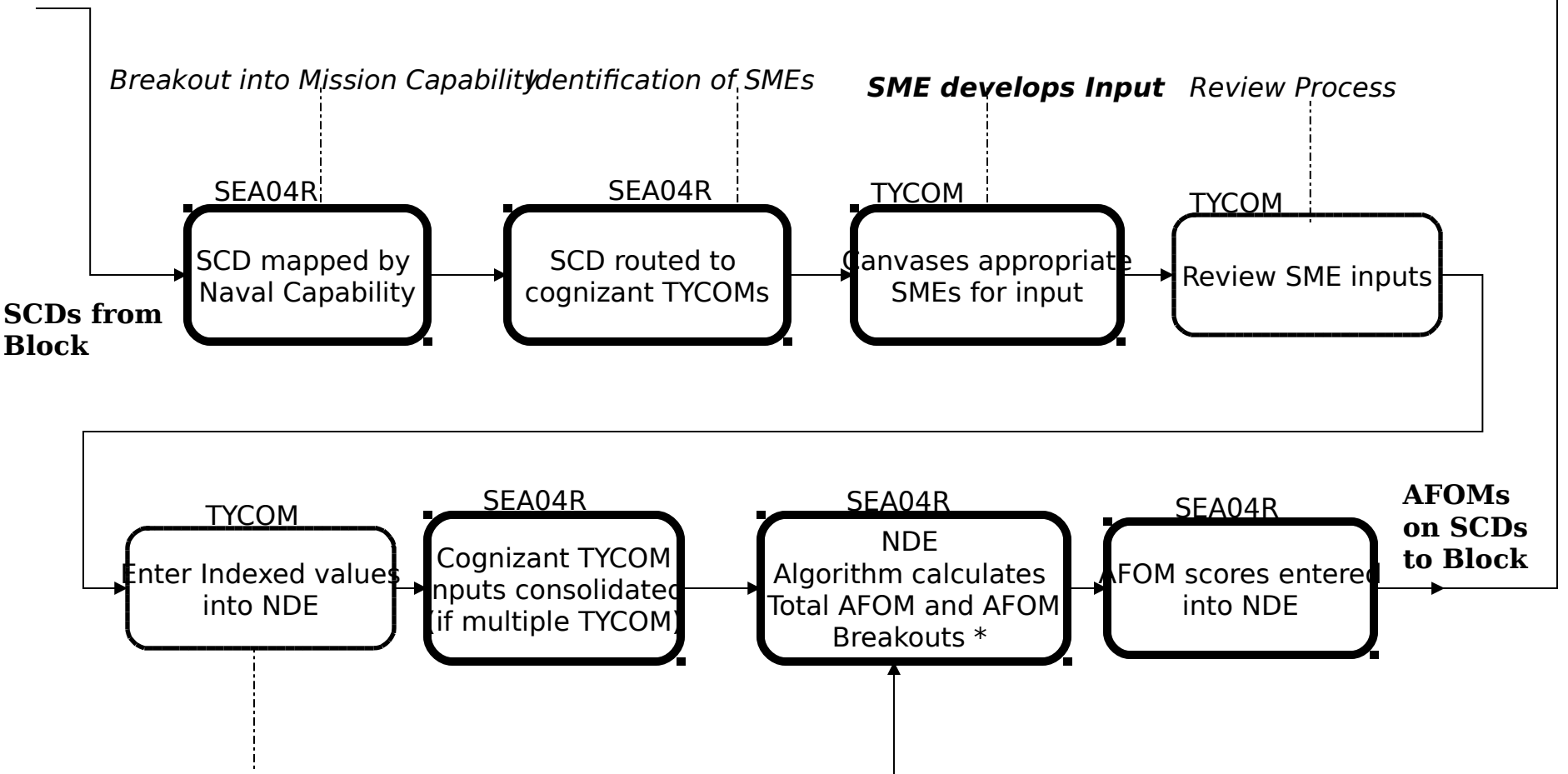
Entitled State: Level III Periodic External

Process Flow (Level III) – Calculate Initial AFOM

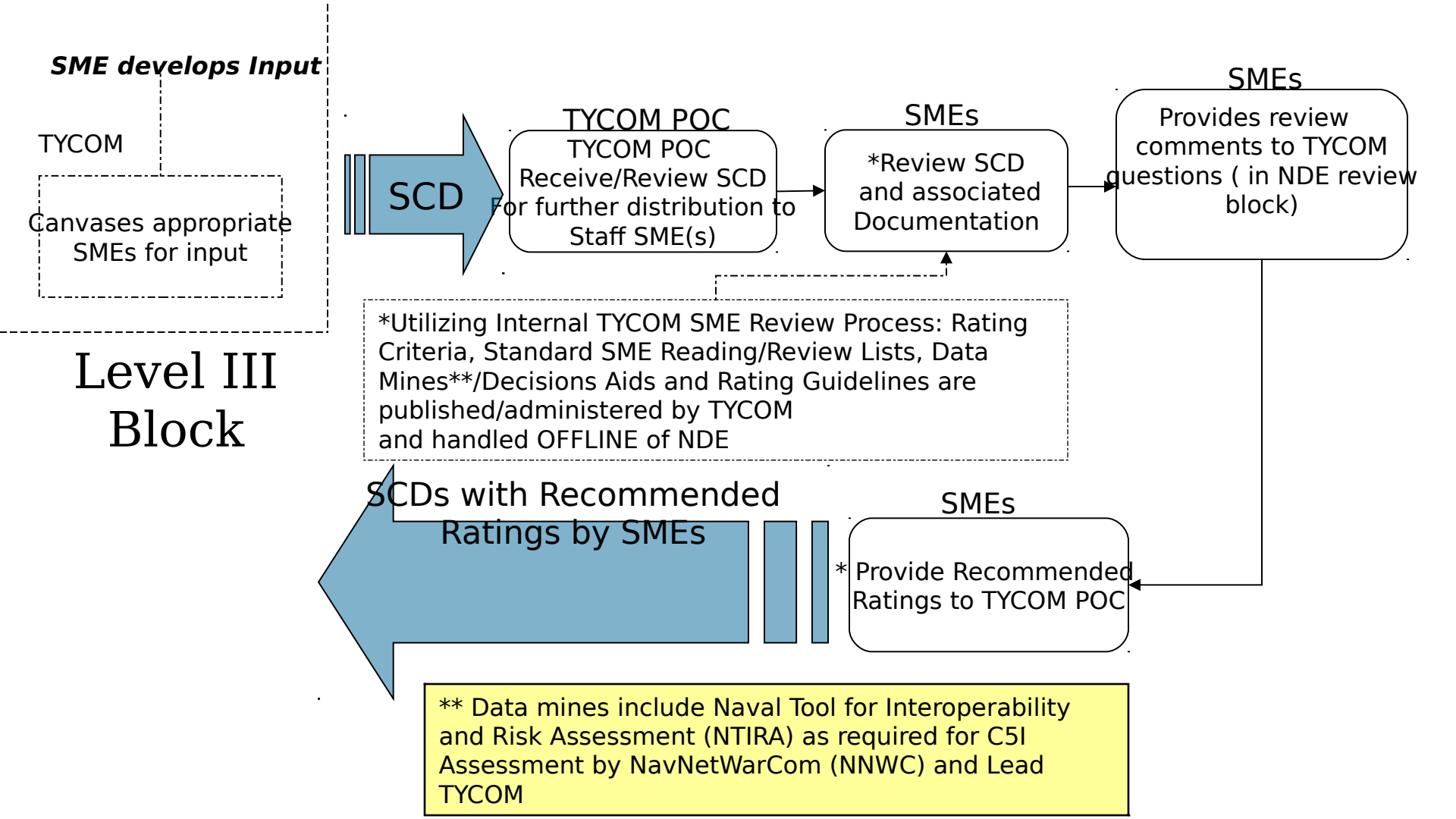
2

Outputs from Block

Outputs to Block



Process Flow (Level IV): Calculate Initial AFOM; Fleet SCD Assessment; SME Develops Inputs to TYCOM


SME develops Input
TYCOM
Canvases appropriate SMEs for input
Level III Block
SCD
TYCOM POC
TYCOM POC Receive/Review SCD For further distribution to Staff SME(s)
SMEs
*Review SCD and associated Documentation
SMEs
Provides review comments to TYCOM questions (in NDE review block)
*Utilizing Internal TYCOM SME Review Process: Rating Criteria, Standard SME Reading/Review Lists, Data Mines**/Decisions Aids and Rating Guidelines are published/administered by TYCOM and handled OFFLINE of NDE
SCDs with Recommended Ratings by SMEs
SMEs
* Provide Recommended Ratings to TYCOM POC
** Data mines include Naval Tool for Interoperability and Risk Assessment (NTIRA) as required for C5I Assessment by NavNetWarCom (NNWC) and Lead TYCOM

Example Program Alteration through the Process

- **Example: CIWS Block IB**
- **Step 1: PARM enters AFOM specific data in SCD: Naval Capabilities Checklist**
  - **Unique Identifiers parsed from other portions of SCD (T, F, etc.)**
- **Step 2: SPM sends (autoforward once TA complete) to appropriate TYCOM based on business rules for HM&E, C5I etc.**
- **Step 3: Capabilities Mapping notifies TYCOM of which Scales to use for assigning Index Values in AFOM Benefit Structure**
  - **All Eleven (11) Suitability Scales used for every SCD**
- **Step 4: TYCOM canvasses Staff SMEs (and others) for information**
- **Step 5: TYCOM assigns Index values for all Suitability and Specific Naval Capabilities (from Step 1 mapping) into NDE**
- **Output: AFOM Calculated by NDE**

	1	2	3	4	5	6	7
Attribute	**Significant Degradation**	**Degradation**	**Marginal Degradation**	**No change**	**Marginal Improvement**	**Improvement**	**Significant Improvement**
Provide Self Defense Against Surface Threats							**X**

Index Scale

Sea Shield

Force Protection

- ✓ **Protect Against SOF and Terrorist Threats (W1)**
- **Mitigate Effects of CBRNE**

Surface Warfare

- ✓ **Provide Self-Defense Against Surface Threats (W2)**
- **Conduct Offensive Operations against Surface Threats**

Under Sea Warfare

- **Provide Self-Defense Against Subsurface Threats**
- **Neutralize Submarine Threats in the Littorals**
- **Neutralize Open Ocean Submarine Threats**
- **Counter Minefields from Deep to Shallow Water**
- **Breach Minefields, Obstacles, and Barriers from Very Shallow Water to the Beach Exit Zone**
- **Conduct Mining Operations**

Theater Air and Missile Defense

- ✓ **Provide Self-Defense Against Air and Missile Threats (W3)**
- **Provide Maritime Air and Missile Defense**
- **Provide Overland Air and Missile Defense**
- **Conduct Sea-Based Missile Defense**

Example: CIWS 1B TYCOM
ating (as mapped by PARM
and validated by TYCOM)

W1, W2,W3: Annual Weights established by O-6 Fleet Weighting Board

Sea Shield Capabilities SCD Checklist

Example RMAS Suitability Indexing by TYCOM for CIWS 1B

	1	2	3	4	5	6	7
Attribute	**Significant Degradation**	**Degradation**	**Marginal Degradation**	**No change**	**Marginal Improvement**	**Improvement**	**Significant Improvement**
Reliability						X	
Maintainability						X	
Operational Availability						X	
Supportability					X		
Ship Distributed Systems Margins				X			

QOS/QOL, Safety, etc. Portions of Suitability Structure Receive Same Assessment by TYCOM

Example AFOM Output to RCP for CIWS IB

(X) = Unique Flags:

(S) Statutory

(F) Expedite

(T) TMA/TMI

(R) Regulatory

(C) Conjunctive

(J) Joint Interop.

Overall AFOM: 80 (F)

Capability: 82

- Sea Base: 21
- Sea Strike: 21
- Sea Shield: 92
- ForceNet:21

QOS/QOL:30

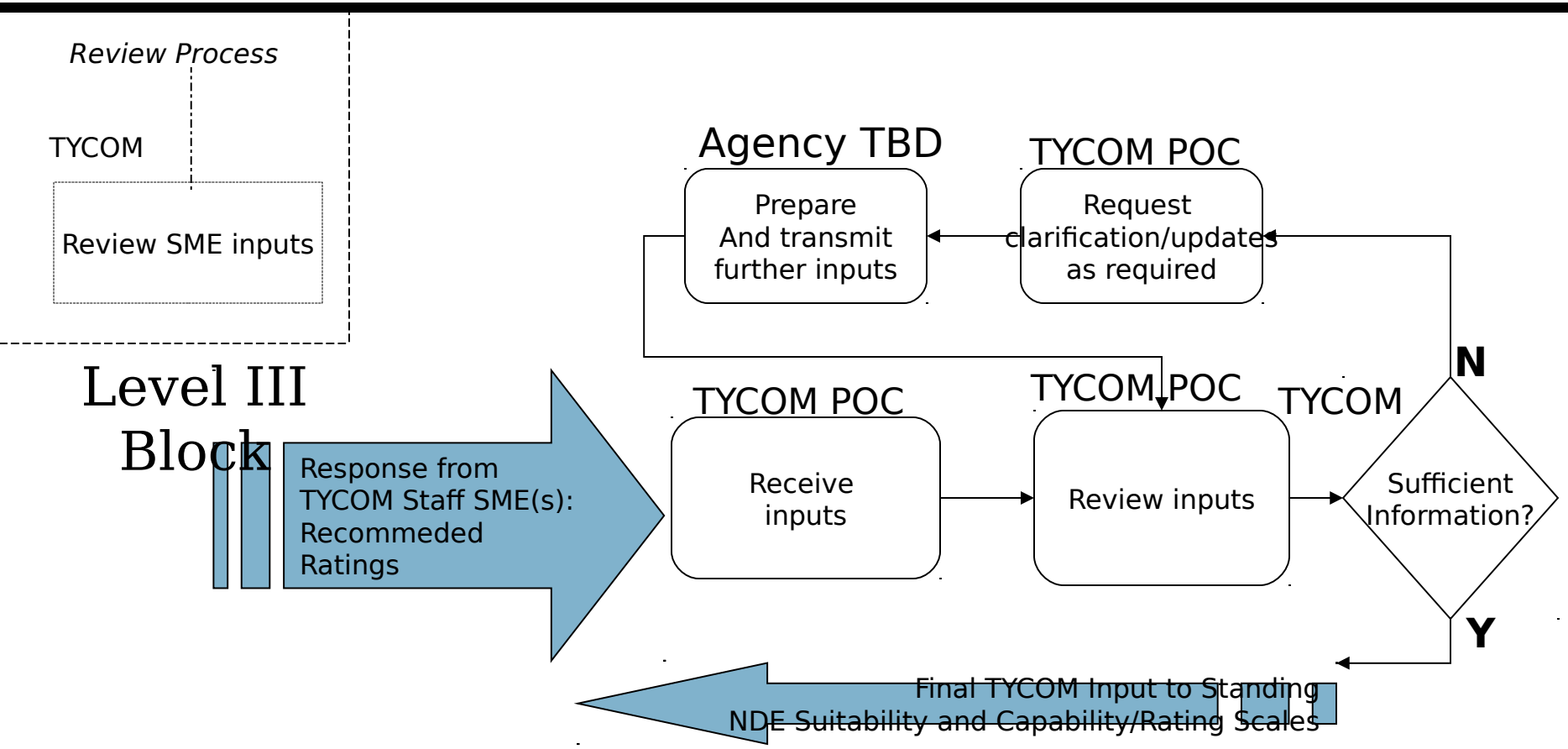
Suitability: 55

Not Actual Values

"Comments (From SME/TYCOM): CIWS IB provides increased operational capability for defeating swarming small boats as well as

BACK UP

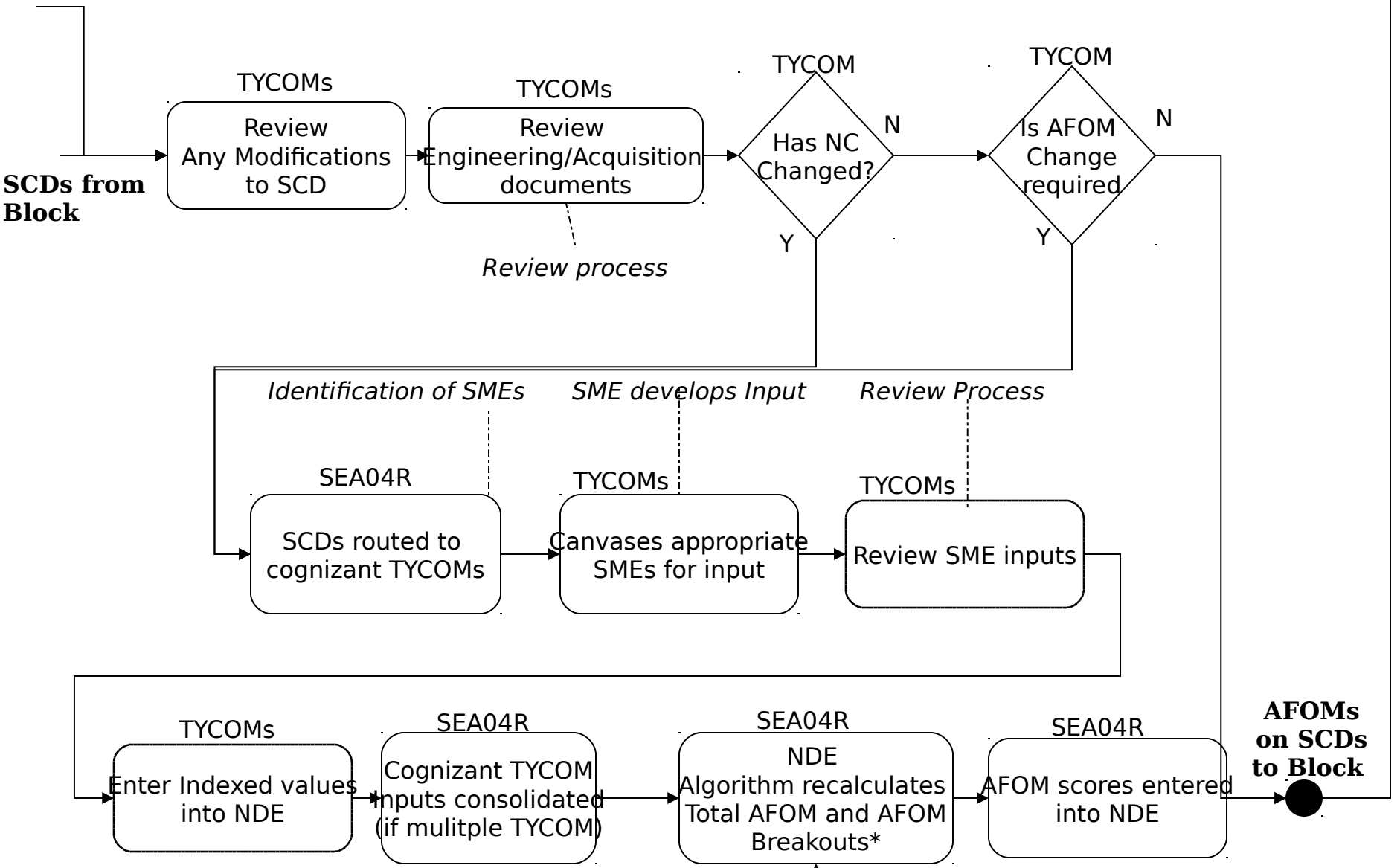
Process Flow (Level IV): Calculate Initial AFOM; Fleet SCD Assessment: TYCOM Review Process



Process Flow (Level III)
Block – 1st Update AFOM

Outputs from Block

Outputs to Block



Phase II **7 days**

* See Business Rules

NC: Naval Capability from

Example Output to RCP

Overall AFOM: 65 (T)

Capability: 40

- Sea Base: 35
- Sea Strike: 70
- Sea Shield: 21
- ForceNet:21

QOS/QOL:21

Suitability: 37

Unique Flags:

(S) Statutory

(F) Expedite

(T) TMA/TMI

(R) Regulatory

(C) Conjunctive

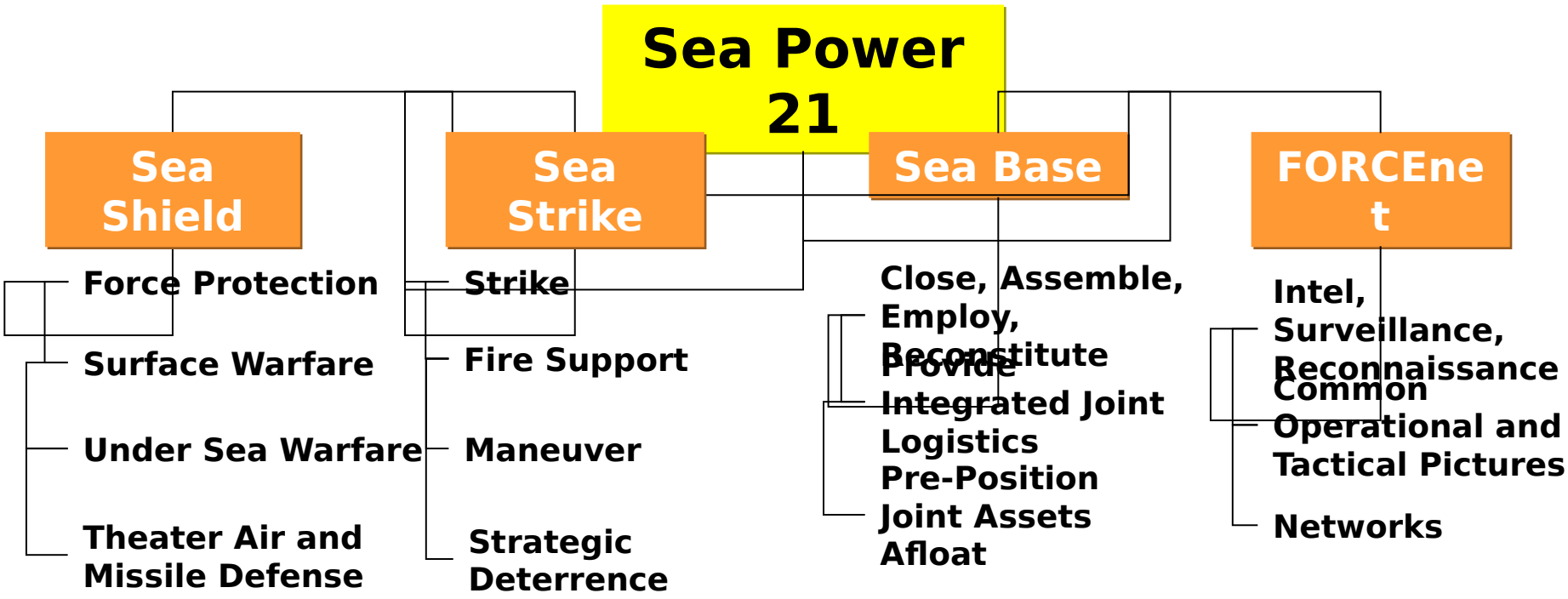
(J) Joint Interop.

AFOM Process

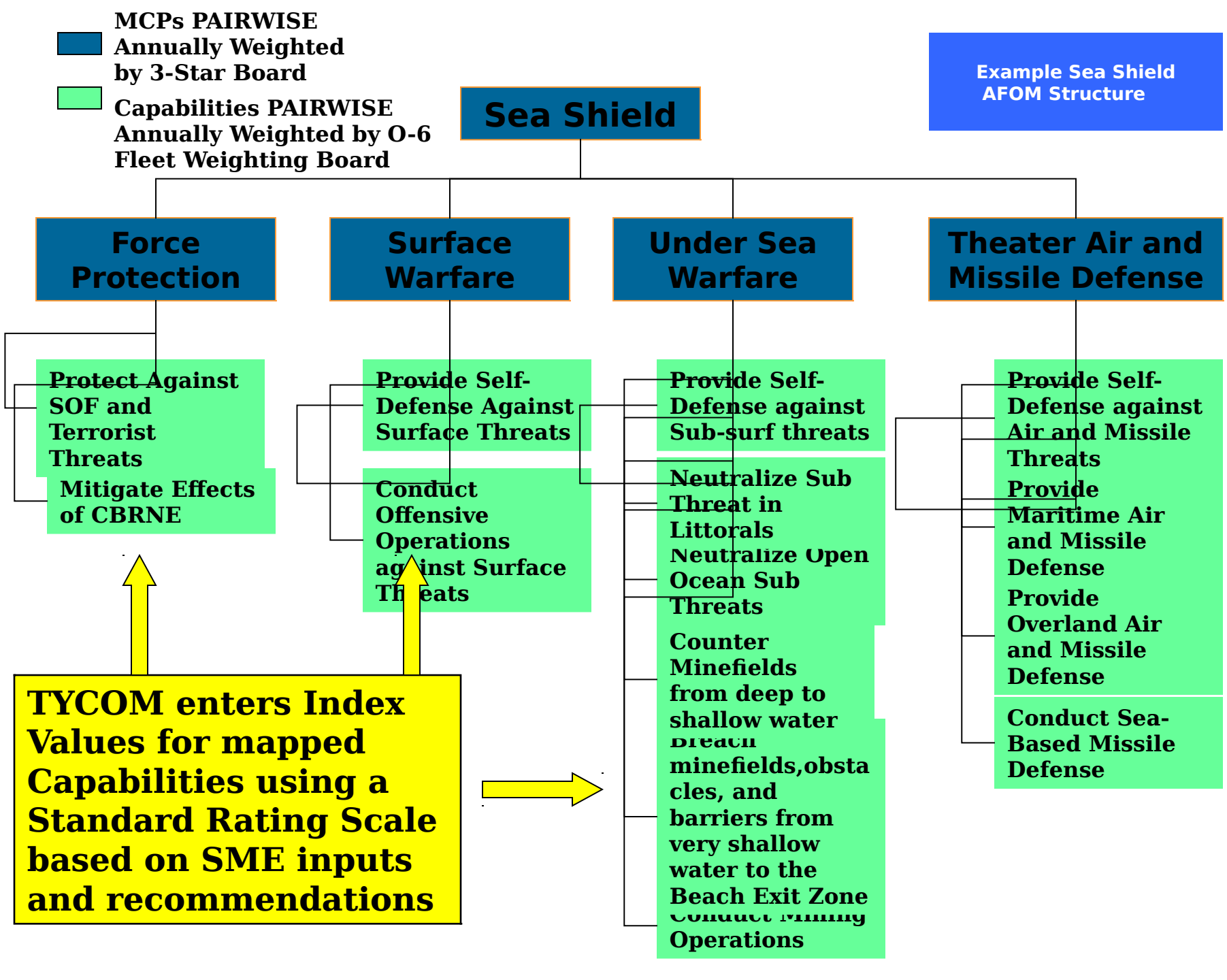
- **General Process:**
  - **Submitter enters SCD into NDE; ALT is mapped to one or more of 61 specific Naval Capabilities (Warfighting functions)**
    - **“Operational to System Architecture”**
  - **SCDs received by the Type Commanders (TYCOM)**
  - **TYCOMs assign numerical Index values against the mapped Capabilities and 11 Suitability (Reliability, Quality of Service/Quality of Life, Safety, etc.) Attributes**
  - **Index values are rolled up into a Weighted Benefit Structure**
    - **Weighted Annually by the Three Star SHIPMAIN Decision Board and Fleet O-6 Weighting Board**

Index values are always assigned to the Suitability Attributes by the TYCOMs

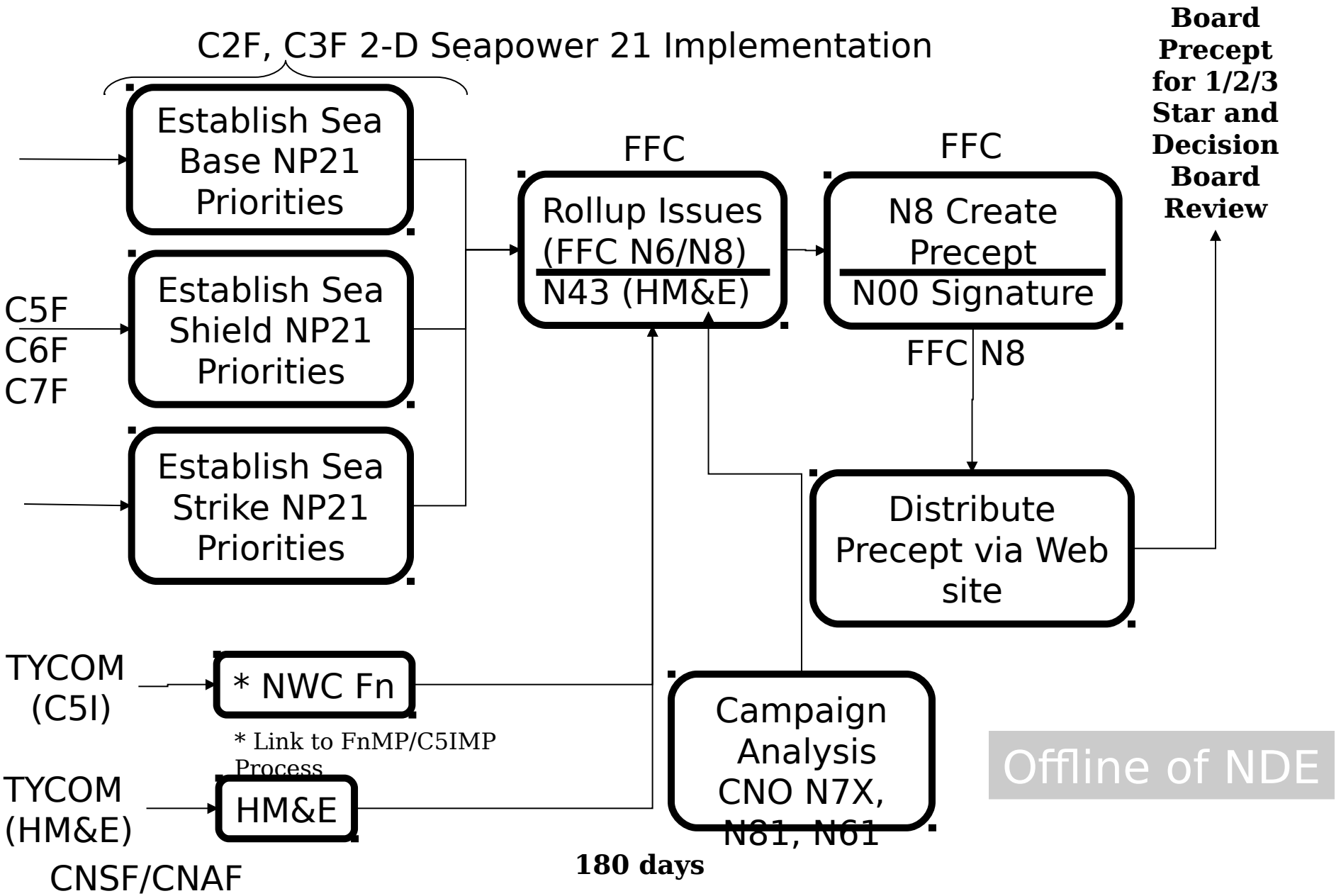
Basis of AFOM Capability Structure



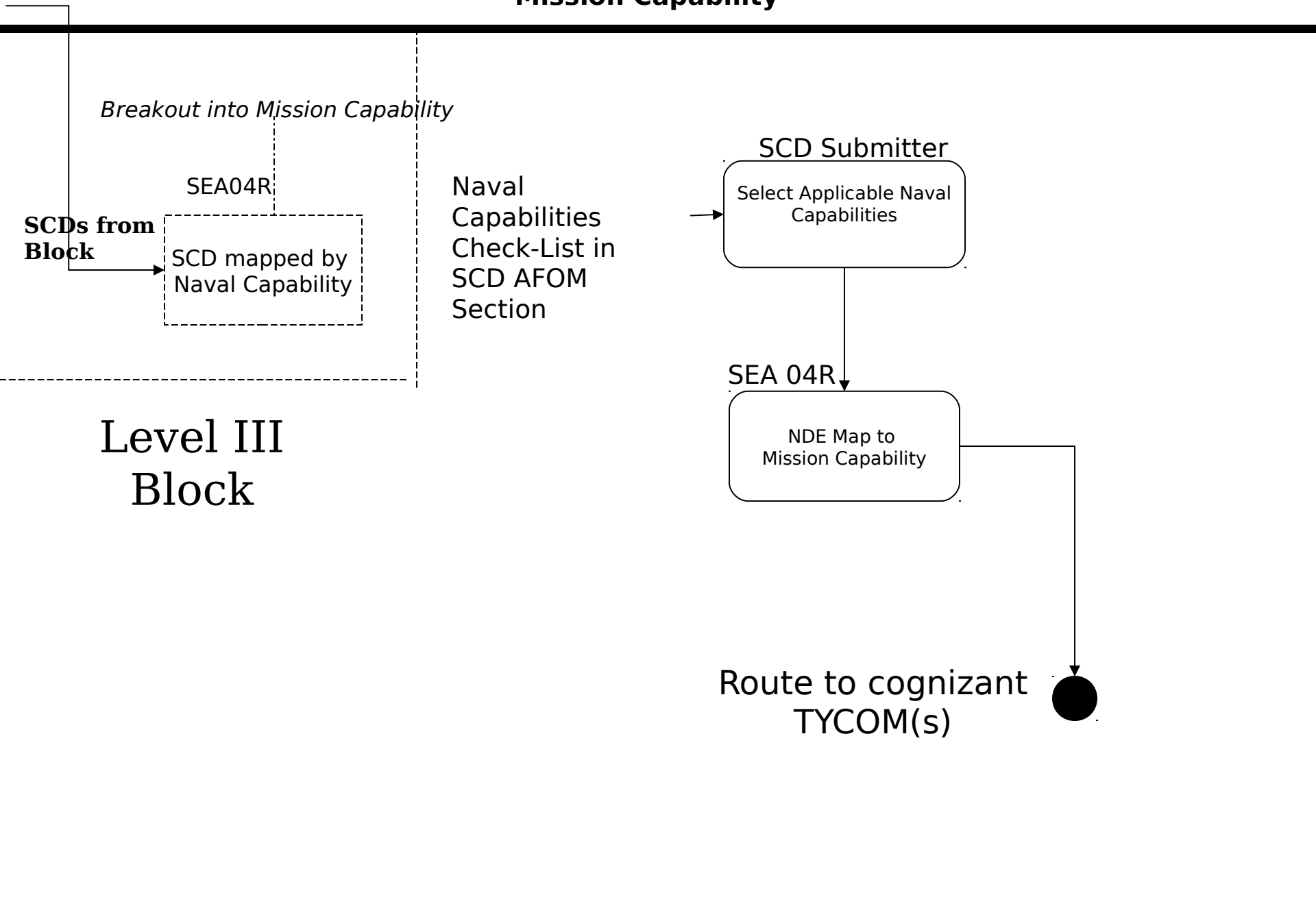
14 MCPs / 61 Capabilities


MCPs PAIRWISE Annually Weighted by 3-Star Board
Capabilities PAIRWISE Annually Weighted by O-6 Fleet Weighting Board
Example Sea Shield AFOM Structure
Sea Shield
Force Protection
Surface Warfare
Under Sea Warfare
Theater Air and Missile Defense
Protect Against SOF and Terrorist Threats
Mitigate Effects of CBRNE
Provide Self-Defense Against Surface Threats
Conduct Offensive Operations against Surface Threats
Provide Self-Defense against Sub-surf threats
Neutralize Sub Threat in Littorals
Neutralize Open Ocean Sub Threats
Counter Minefields from deep to shallow water
Breach minefields,obstacles, and barriers from very shallow water to the Beach Exit Zone
Conduct Mining Operations
Provide Self-Defense against Air and Missile Threats
Provide Maritime Air and Missile Defense
Provide Overland Air and Missile Defense
Conduct Sea-Based Missile Defense
TYCOM enters Index Values for mapped Capabilities using a Standard Rating Scale based on SME inputs and recommendations

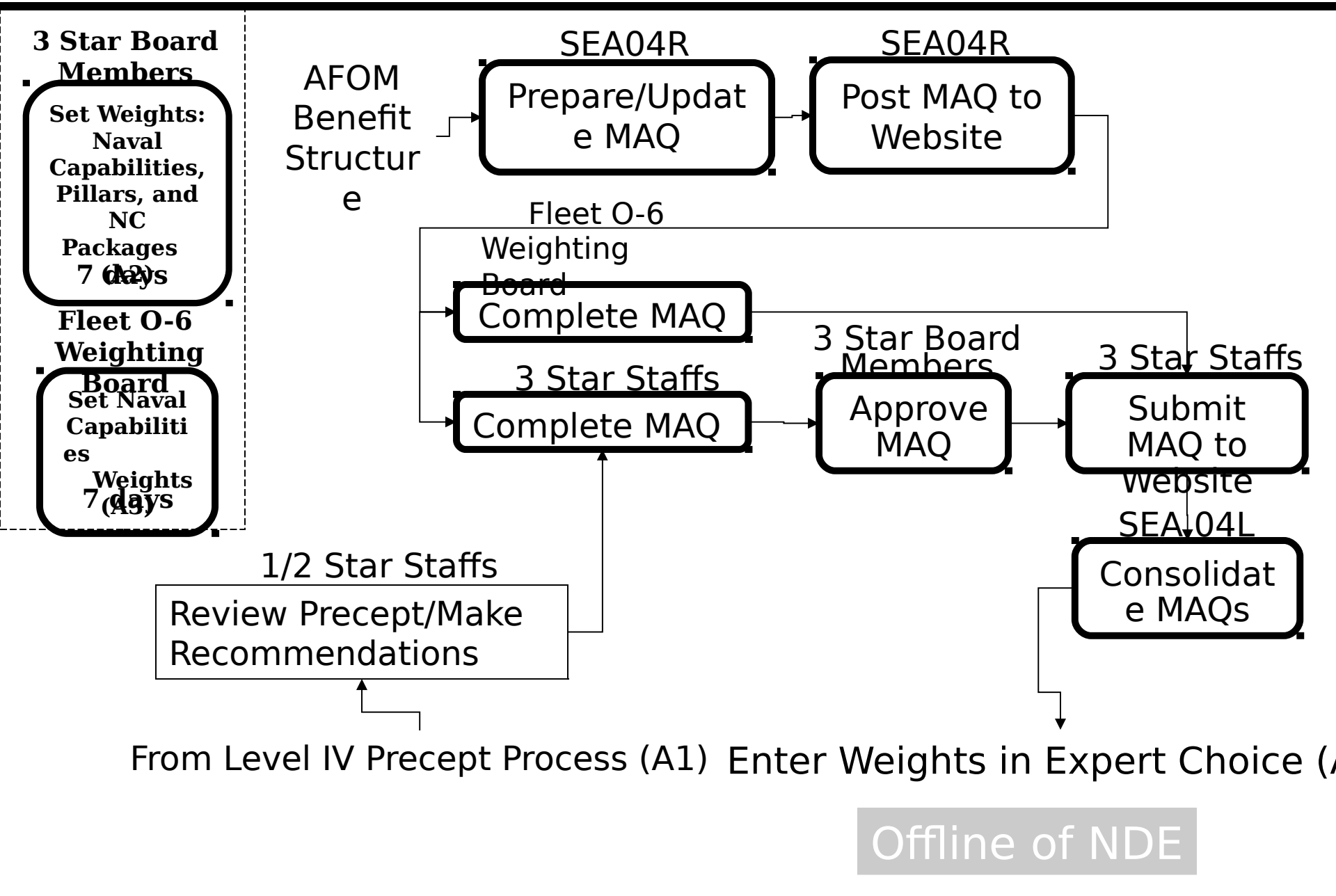
Process Flow (Level IV): Create Board Precept A1



Process Flow (Level IV): Calculate Initial AFOM; Fleet SCD Assessment; Breakout into Mission Capability



Process Flow (Level IV): Develop 3 Star and Fleet O-6 Weighting Board AFOM Weights: A2,A3



Offline of NDE

Process Flow (Level IV)
Blocks – 1st and 2nd Update AFOM (combined)

SME develops Input

Canvases appropriate SMEs for input

Internal TYCOM Rating Criteria, Standard SME Reading/Review Lists and Rating Guidelines

Level III Block

SCD Data

SME

TYCOM POC query

SME

* Review SCD and associated Documentation

SME

SME Assesses SCD Against Established Attributes and Rating Criteria

SME

* Provide Recommended Ratings to TYCOM

SCDs with Recommended Ratings by SMEs

For all other Level III sub-blocks, the Level IV Processes for 1st and 2nd Update AFOM are identical to Initial AFOM Level IV Processes:

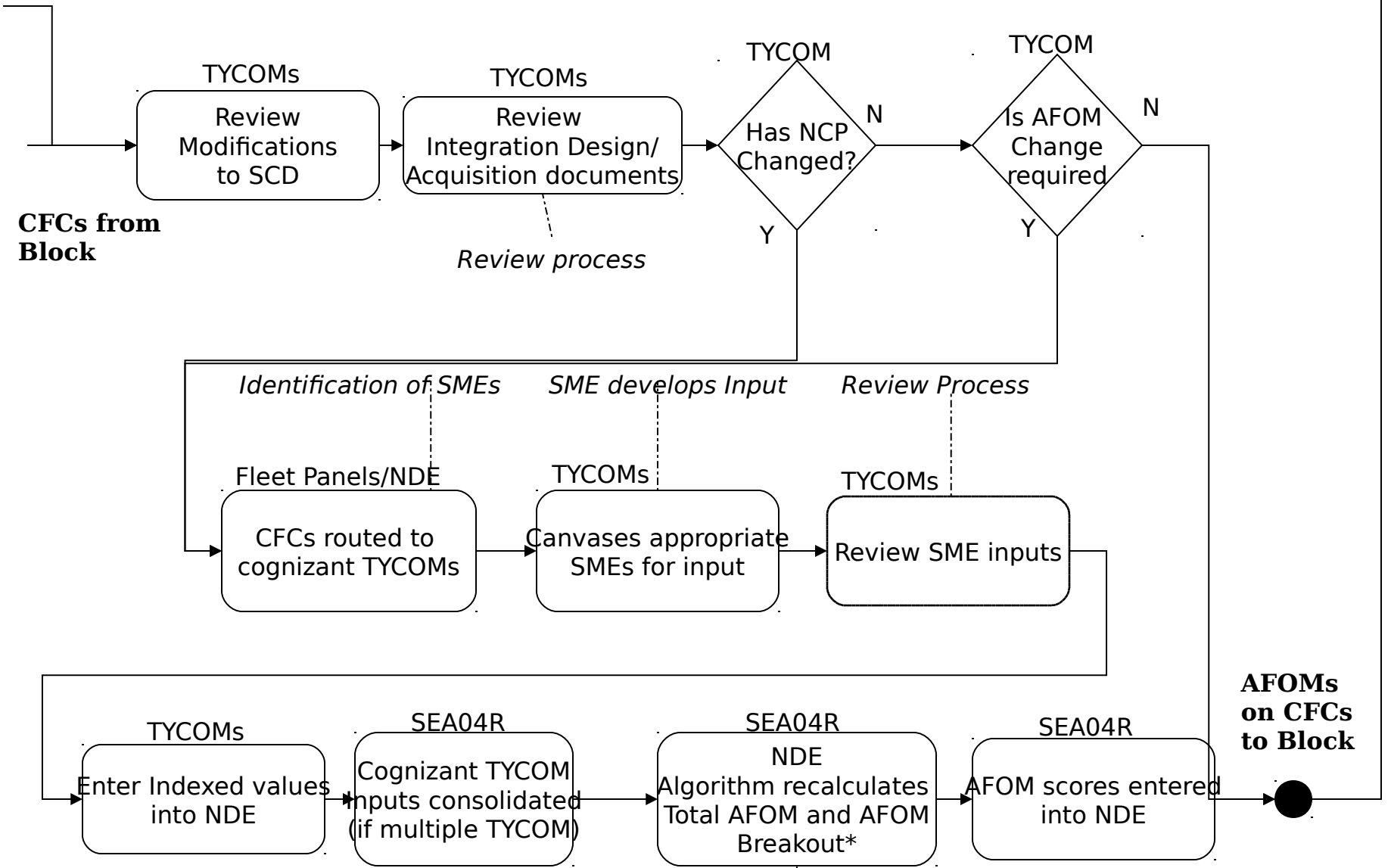
- TYCOM Review Process
- Identification of SMEs
- TYCOM Review of SME Inputs

*Internal TYCOM SME Review Process: Rating Criteria, Standard SME Reading/Review Lists, Data Mines/Decisions Aids and Rating Guidelines are published/administered by TYCOM and handled OFFLINE of NDE

Process Flow (Level III)
Block– 2nd Update AFOM

Outputs from Block

Outputs to Block



Phase III/IIA **7 days**

* See Business Rules

Example Merit Assessment Questionnaire

Merit Assessment Questions for Fleet 3-Star Board Members

Instructions: Using the scale below, please answer the following questions. Your responses will be compared with your counterparts on the SHIPMAIN 3 Star Board to determine a consensus opinion using the Expert Choice software to weight the Business Case Alteration Figure of Merit (AFOM) attributes, consisting of the Capabilities (Naval Power 21 Pillars) balanced against Suitability.

For example, you may determine that the 'Sea Base" Pillar of NP-21 is more important than the Sea Shield attribute for this review cycle. Accordingly, your preference would be indicated by selecting Moderate, Strong or Very Strong on the left side of the scale to delineate this as a priority.
RMAS: Reliability, Maintainability, Operational Availability or Supportability

Extremely	Very Strong	Strong	Moderate	Equal	Moderate	Strong	Very Strong	Extremely

1. Which attribute contributes more to the Overall Warfighting Benefit?

Capability		Suitability

2. For each pair of Naval Capabilities, which Capability more important with respect to the CNO's Naval Power 21 Goals?

Sea Shield		Sea Strike
Sea Shield		Sea Basing
Sea Shield		ForceNet
Sea Strike		Sea Basing
Sea Strike		ForceNet
Sea Basing		ForceNet

3. Which Mission Capability Packages within each pair of MCPs are more important with respect to the Sea Shield Naval Capability of Naval Power 21.

Force Protection		Surface Warfare
Force Protection		Under Sea Warfare
Force Protection		Theater Air Missile Defense
Surface Warfare		Under Sea Warfare
Surface Warfare		Theater Air Missile Defense

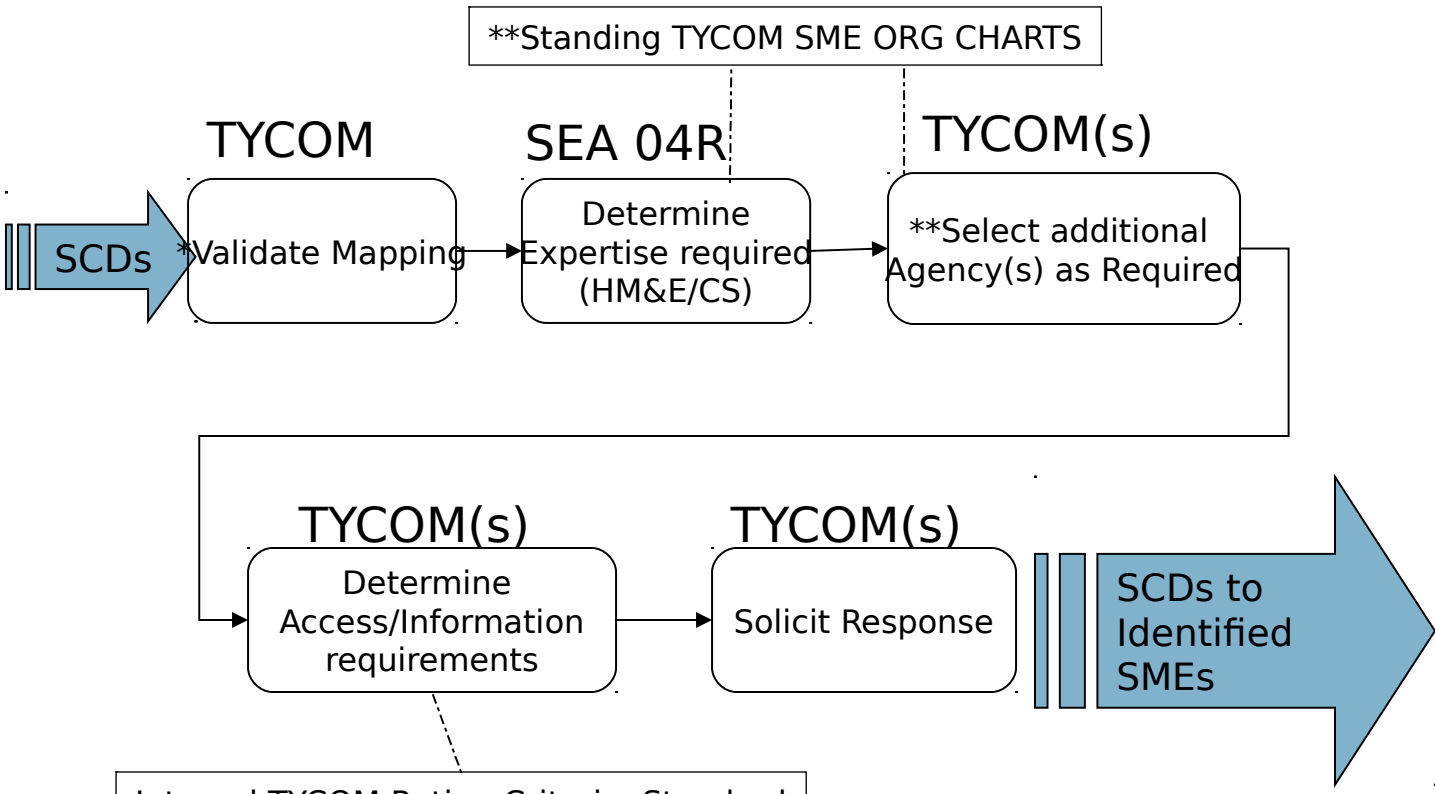
Process Flow (Level IV): Calculate Initial AFOM; Fleet SCD Assessment: Identification of SMEs

Identification of SMEs

Fleet Panels/NDE

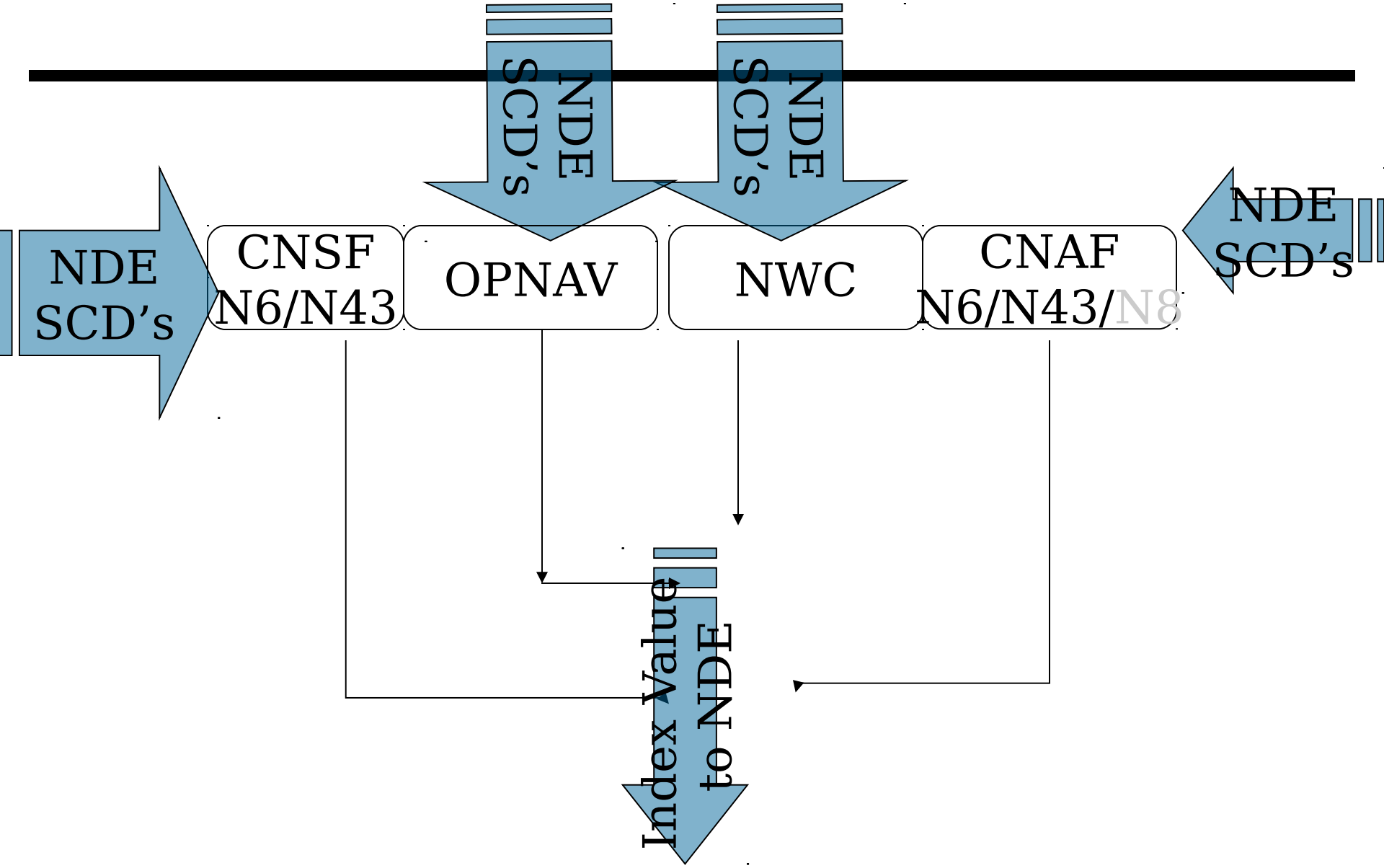
SCDs routed to cognizant TYCOMs

Level III Block

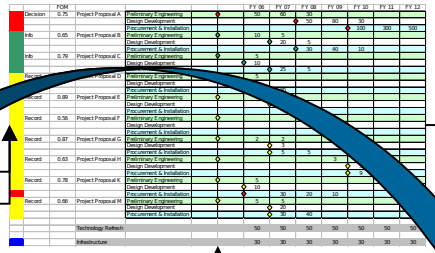


*Changes to mapping requir
NDE notification to submitte
**TYCOM codes, ATG, RMCs
(example: N6/N43/N8, etc...

AFOM Representative ORG Chart



Modernization Plan



ISCPP
ISCP
SPP

Decision Board

Recommendation to MDA

MS A

Decision Board

Recommendation to MDA

MS B

Decision Board

Recommendation to MDA

MS C

INITIAL

UPDATE 1

FINAL UPDATE

Preliminary Engineering

Preliminary Design

Development

Procure

Recommended Change Package (RCP)

Cost Benefit Analysis

Assign AFOM

Technical Assessment

Review Cycle

Cost Benefit Analysis

Assign AFOM

Technical Assessment

Review Cycle

Cost Benefit Analysis

Assign AFOM

Technical Assessment

Review Cycle

Ship Change Document

Program Alt

Fleet Alt

System Design Effort

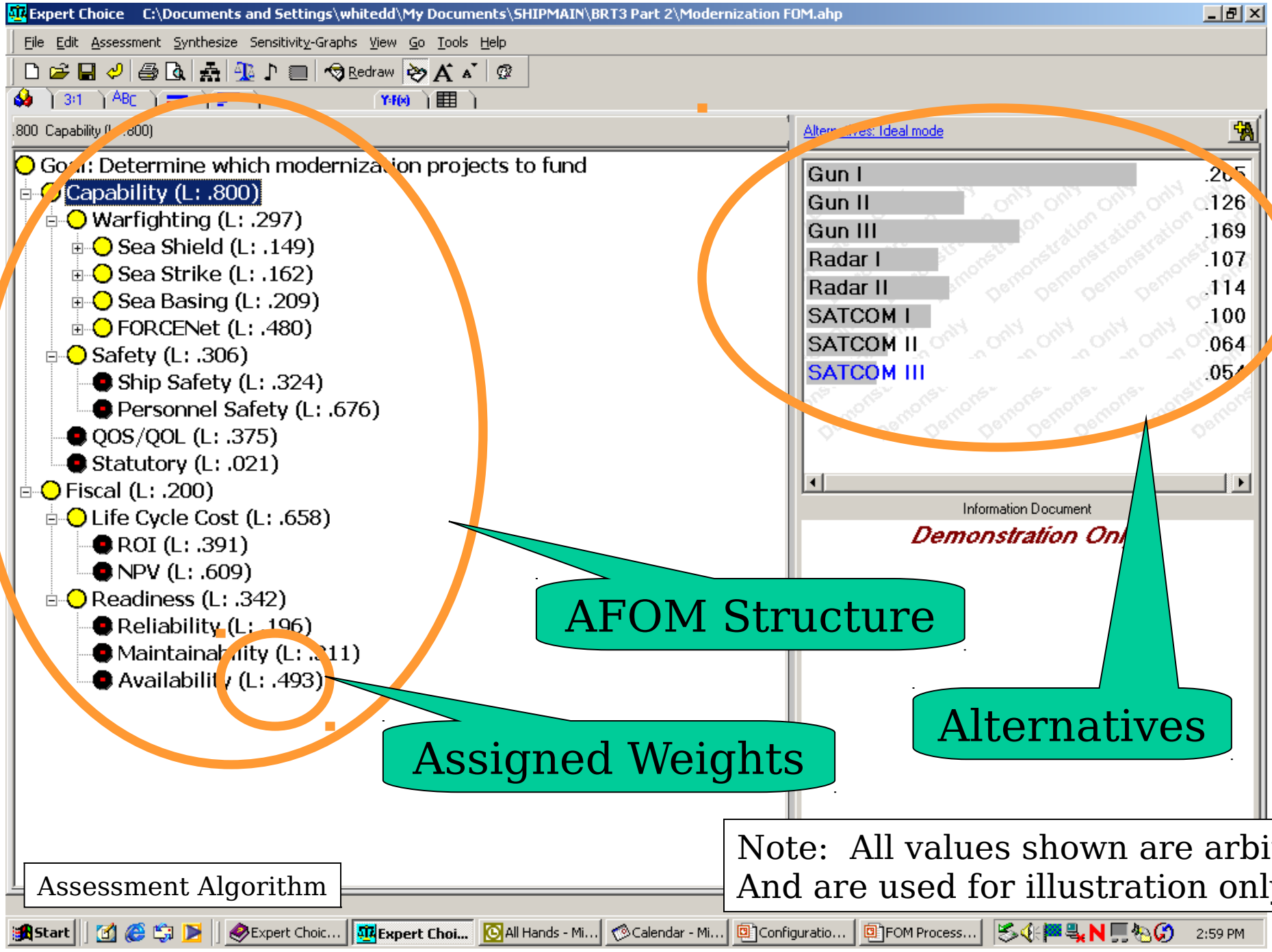
Modification System Performance Specification

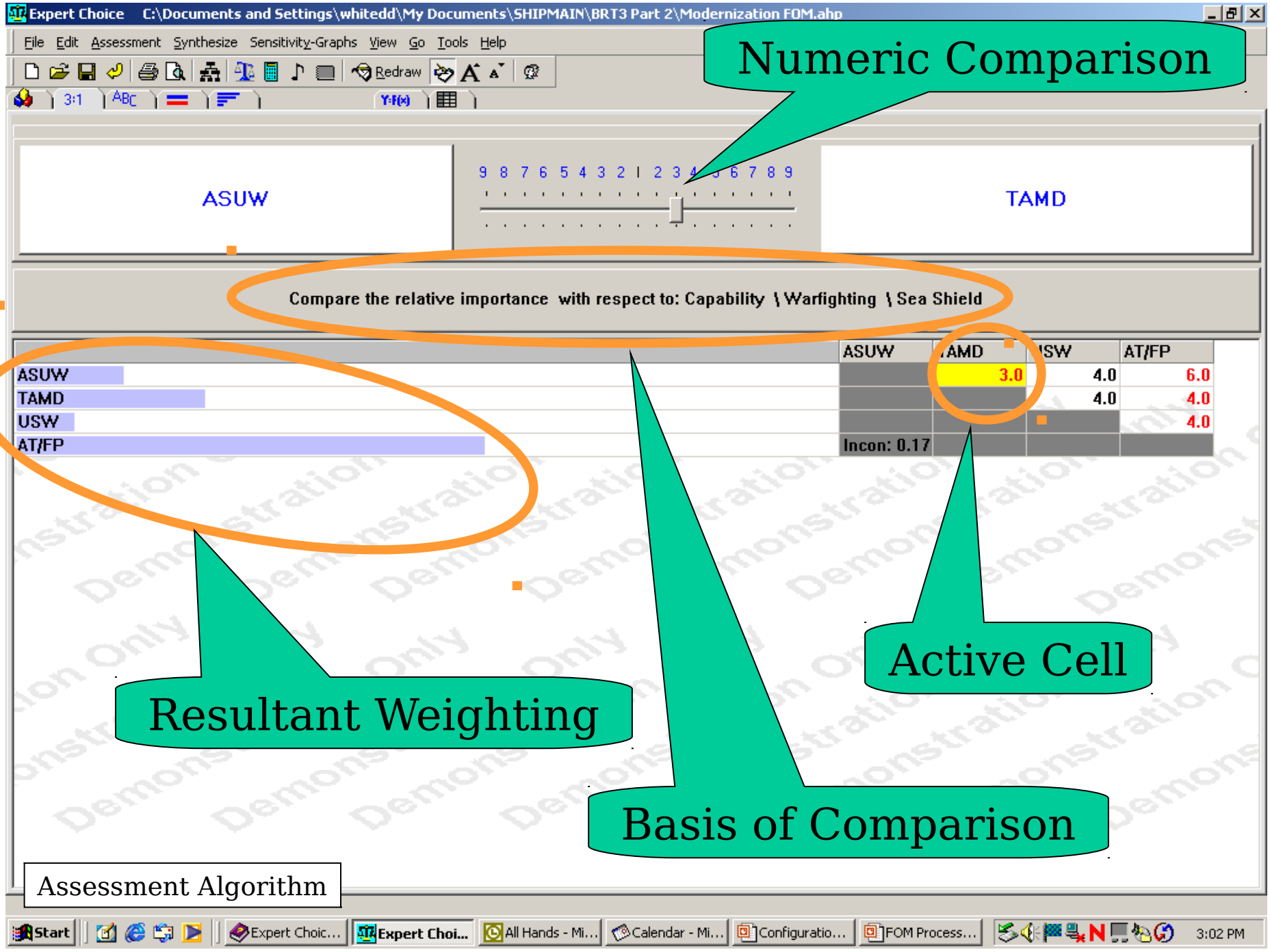
System Design Effort

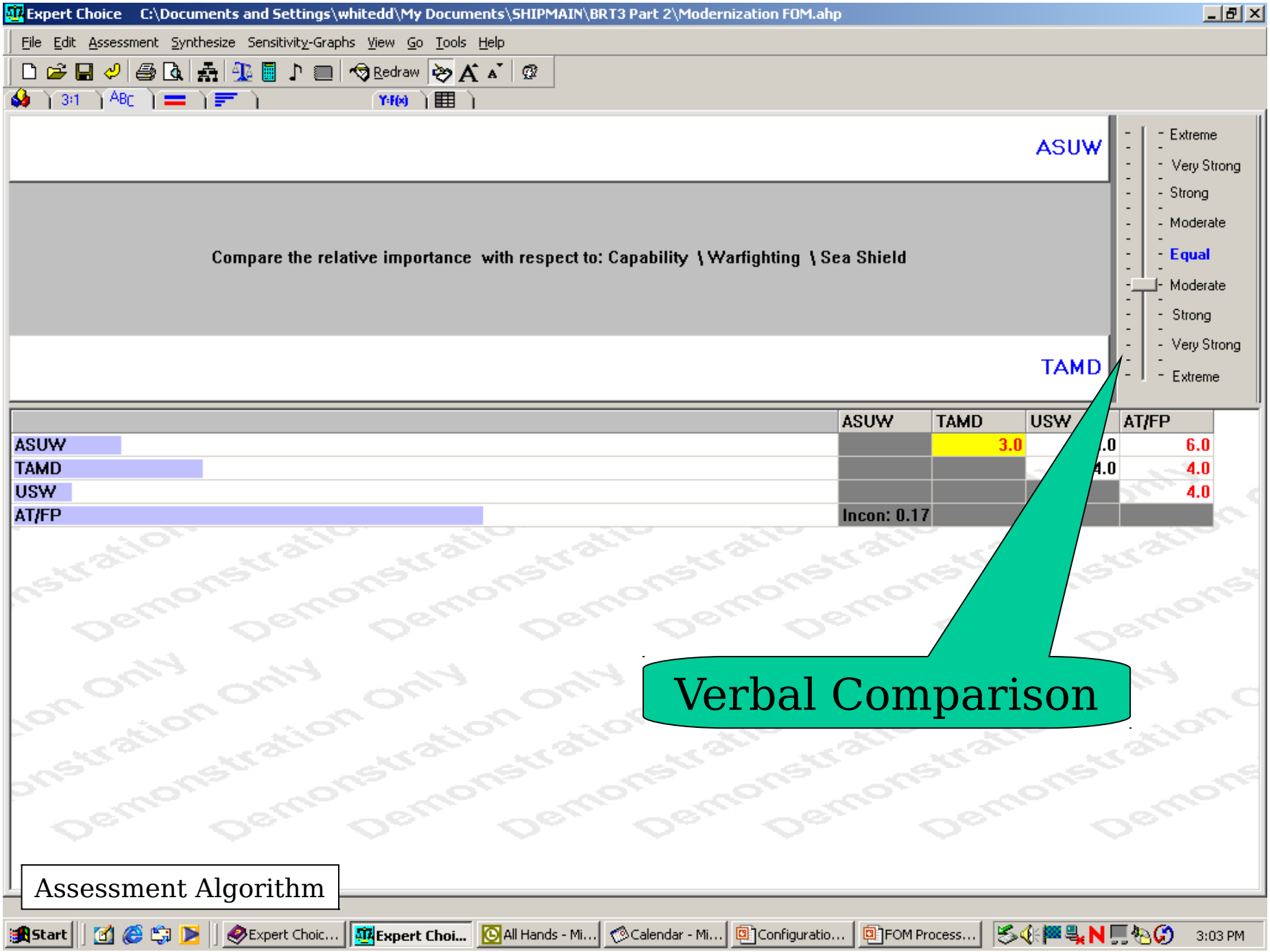
Modification System Detail Specification

Procure & Install

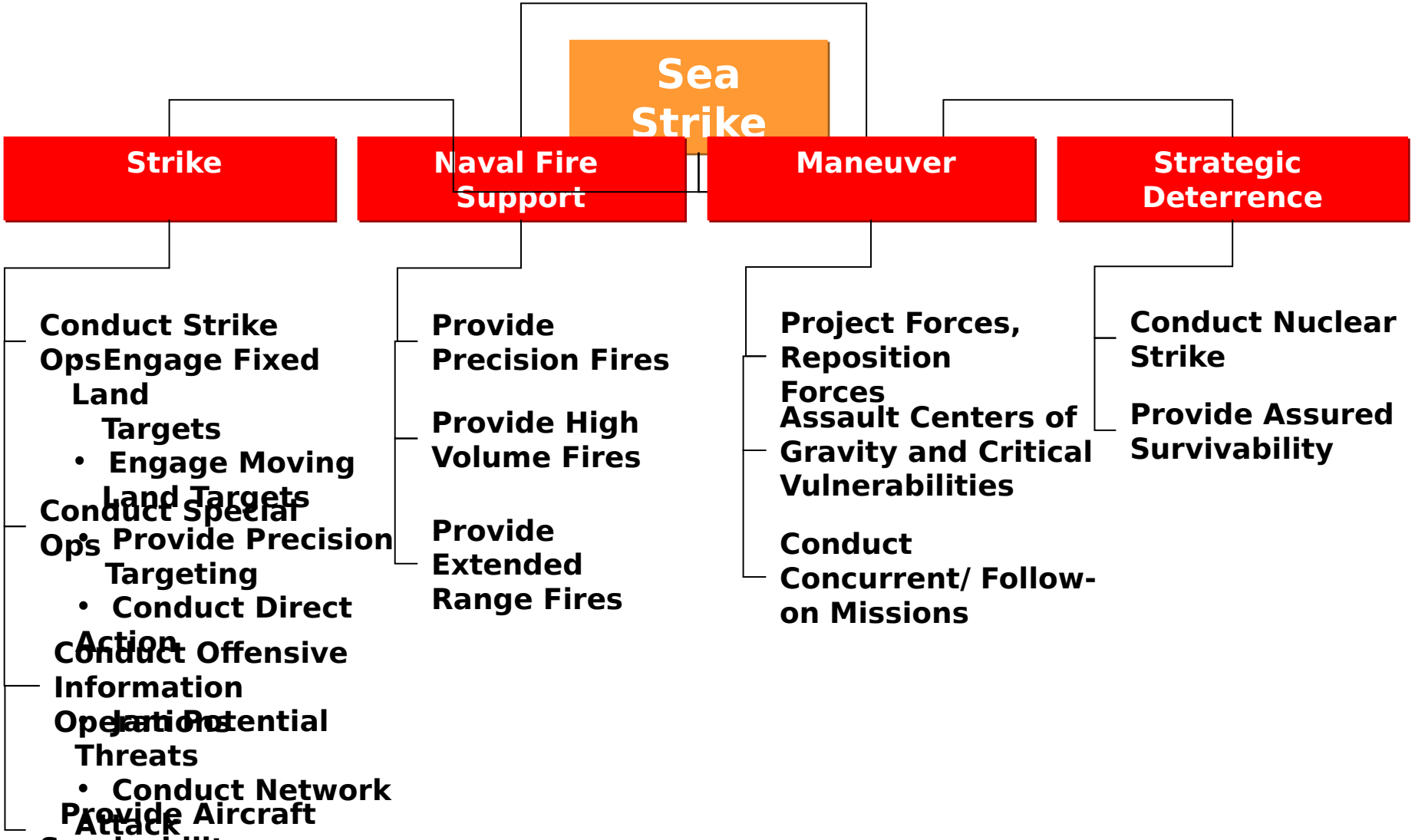
SHIPMAIN Alt & Mod Process


Expert Choice C:\Documents and Settings\whitedd\My Documents\SHIPMAIN\BRT3 Part 2\Modernization FOM.ahp
File Edit Assessment Synthesize Sensitivity-Graphs View Go Tools Help
Redraw
Goal: Determine which modernization projects to fund
Capability (L: .800)
Warfighting (L: .297)
Sea Shield (L: .149)
Sea Strike (L: .162)
Sea Basing (L: .209)
FORCENet (L: .480)
Safety (L: .306)
Ship Safety (L: .324)
Personnel Safety (L: .676)
QOS/QOL (L: .375)
Statutory (L: .021)
Fiscal (L: .200)
Life Cycle Cost (L: .658)
ROI (L: .391)
NPV (L: .609)
Readiness (L: .342)
Availability (L: .493)
Alternatives: Ideal mode
Gun I
Gun II .126
Gun III .169
Radar I .107
Radar II .114
SATCOM I .100
SATCOM II .064
SATCOM III
Information Document
AFOM Structure
Alternatives
Assigned Weights
Assessment Algorithm
Note: All values shown are arbitr
And are used for illustration only
Start
Expert Choic...
Expert Choi...
All Hands - Mi...
Calendar - Mi...
Configuratio...
FOM Process...
2:59 PM

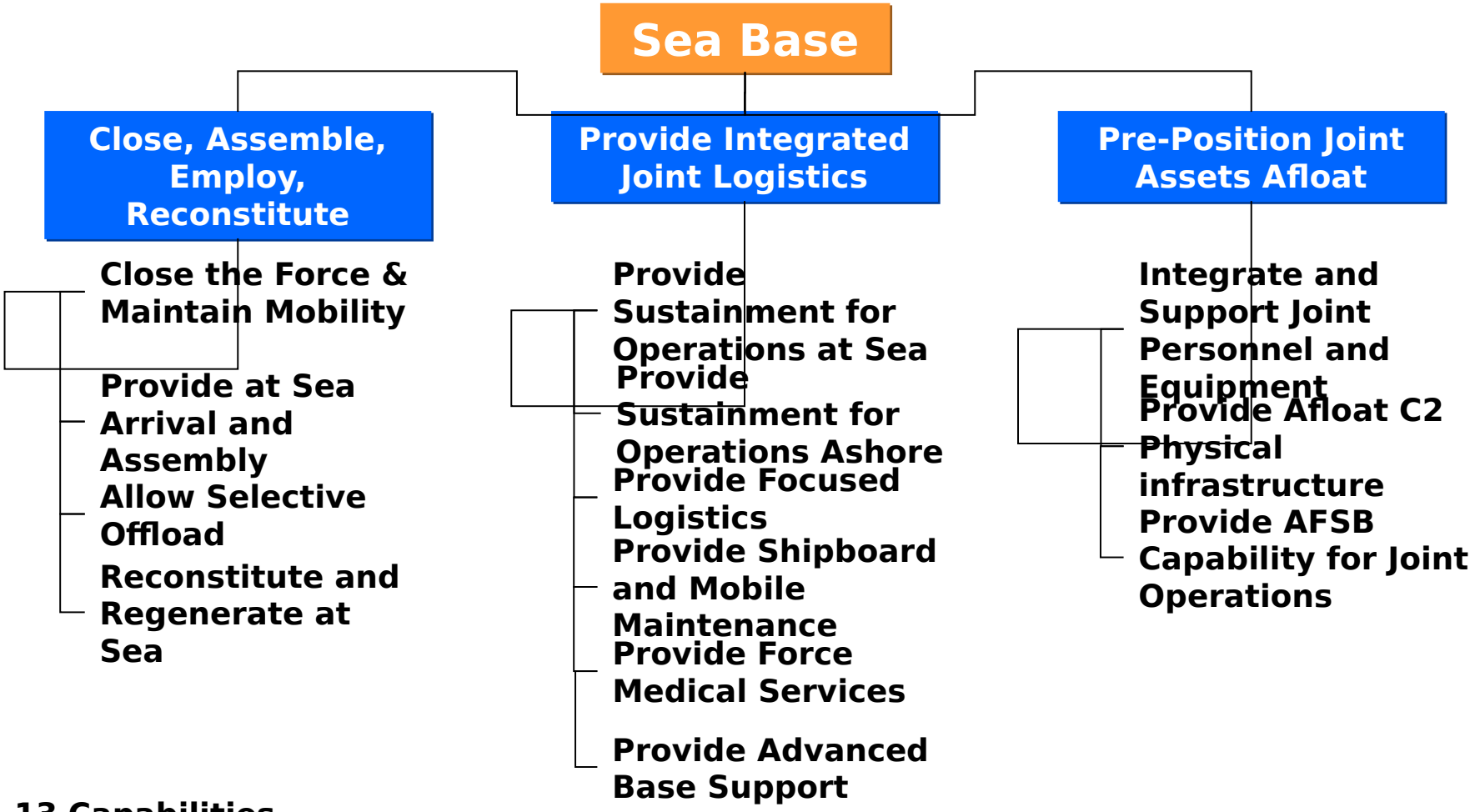

Expert Choice C:\Documents and Settings\whitedd\My Documents\SHIPMAIN\BRT3 Part 2\Modernization FOM.ahp
File Edit Assessment Synthesize Sensitivity-Graphs View Go Tools Help
Redraw
Numeric Comparison
ASUW
9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9
TAMD
Compare the relative importance with respect to: Capability \ Warfighting \ Sea Shield
ASUW TAMD USW AT/FP
ASUW 3.0 4.0 6.0
TAMD 4.0 4.0
USW 4.0
AT/FP Incon: 0.17
Resultant Weighting
Active Cell
Basis of Comparison
Assessment Algorithm
Start
Expert Choic...
Expert Choi...
All Hands - Mi...
Calendar - Mi...
Configuratio...
FOM Process...
3:02 PM


Expert Choice C:\Documents and Settings\whitedd\My Documents\SHIPMAIN\BRT3 Part 2\Modernization FOM.ahp
File Edit Assessment Synthesize Sensitivity-Graphs View Go Tools Help
Redraw
ASUW
Compare the relative importance with respect to: Capability \ Warfighting \ Sea Shield
TAMD
Extreme
Very Strong
Strong
Moderate
Equal
Moderate
Strong
Very Strong
Extreme
ASUW TAMD USW AT/FP
ASUW 3.0 6.0
TAMD 4.0
USW 4.0
AT/FP Incon: 0.17
Verbal Comparison
Assessment Algorithm
Start
Expert Choic...
Expert Choi...
All Hands - Mi...
Calendar - Mi...
Configuratio...
FOM Process...
3:03 PM

Sea Strike MCP Capabilities

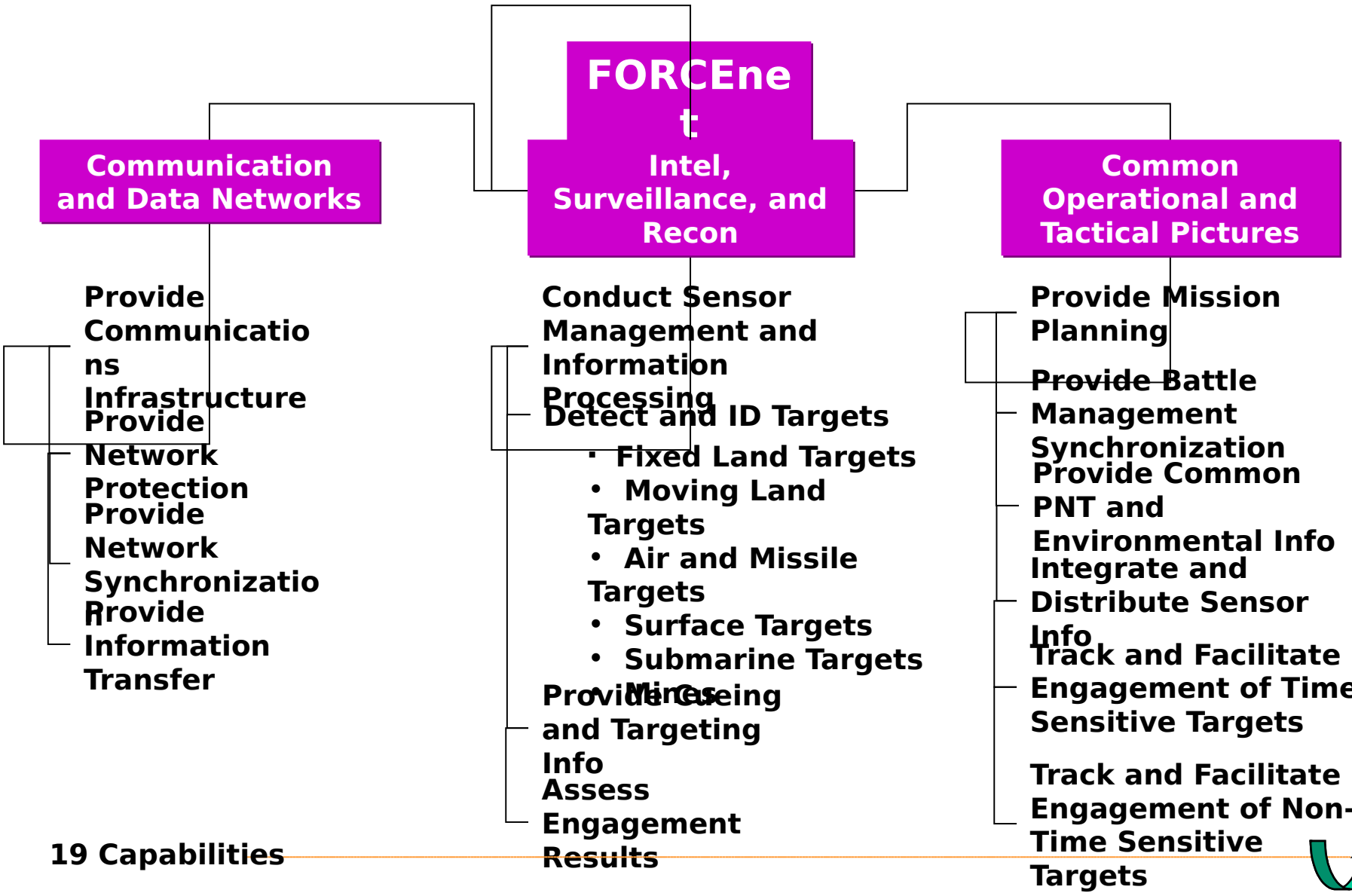


Sea Base MCP Capabilities


Sea Base
Close, Assemble, Employ, Reconstitute
Close the Force & Maintain Mobility
Provide at Sea Arrival and Assembly
Allow Selective Offload
Reconstitute and Regenerate at Sea
Provide Integrated Joint Logistics
Provide Sustainment for Operations at Sea
Provide Sustainment for Operations Ashore
Provide Focused Logistics
Provide Shipboard and Mobile Maintenance
Provide Force Medical Services
Provide Advanced Base Support
Pre-Position Joint Assets Afloat
Integrate and Support Joint Personnel and Equipment
Provide Afloat C2 Physical infrastructure
Provide AFSB Capability for Joint Operations

13 Capabilities

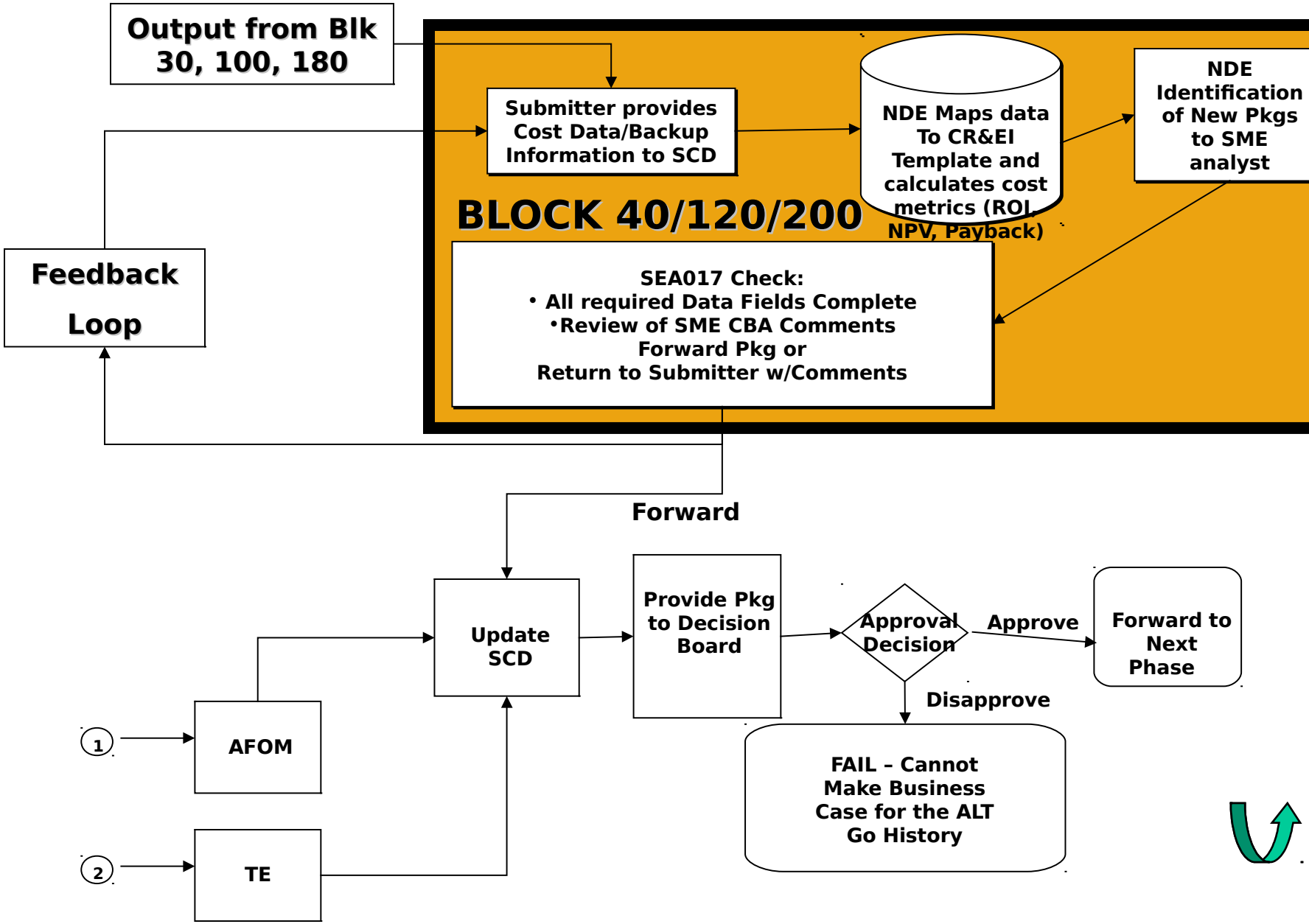
FORCEnet MCP Capabilities


FORCEnet
Communication and Data Networks
Intel, Surveillance, and Recon
Common Operational and Tactical Pictures
Provide Communications Infrastructure
Provide Network Protection
Provide Network Synchronization
Provide Information Transfer
Conduct Sensor Management and Information Processing
Detect and ID Targets
• Fixed Land Targets
• Moving Land Targets
• Air and Missile Targets
• Surface Targets
• Submarine Targets
• Mines
Provide Cueing and Targeting Info
Assess Engagement Results
Provide Mission Planning
Provide Battle Management Synchronization
Provide Common PNT and Environmental Info
Integrate and Distribute Sensor Info
Track and Facilitate Engagement of Time Sensitive Targets
Track and Facilitate Engagement of Non-Time Sensitive Targets

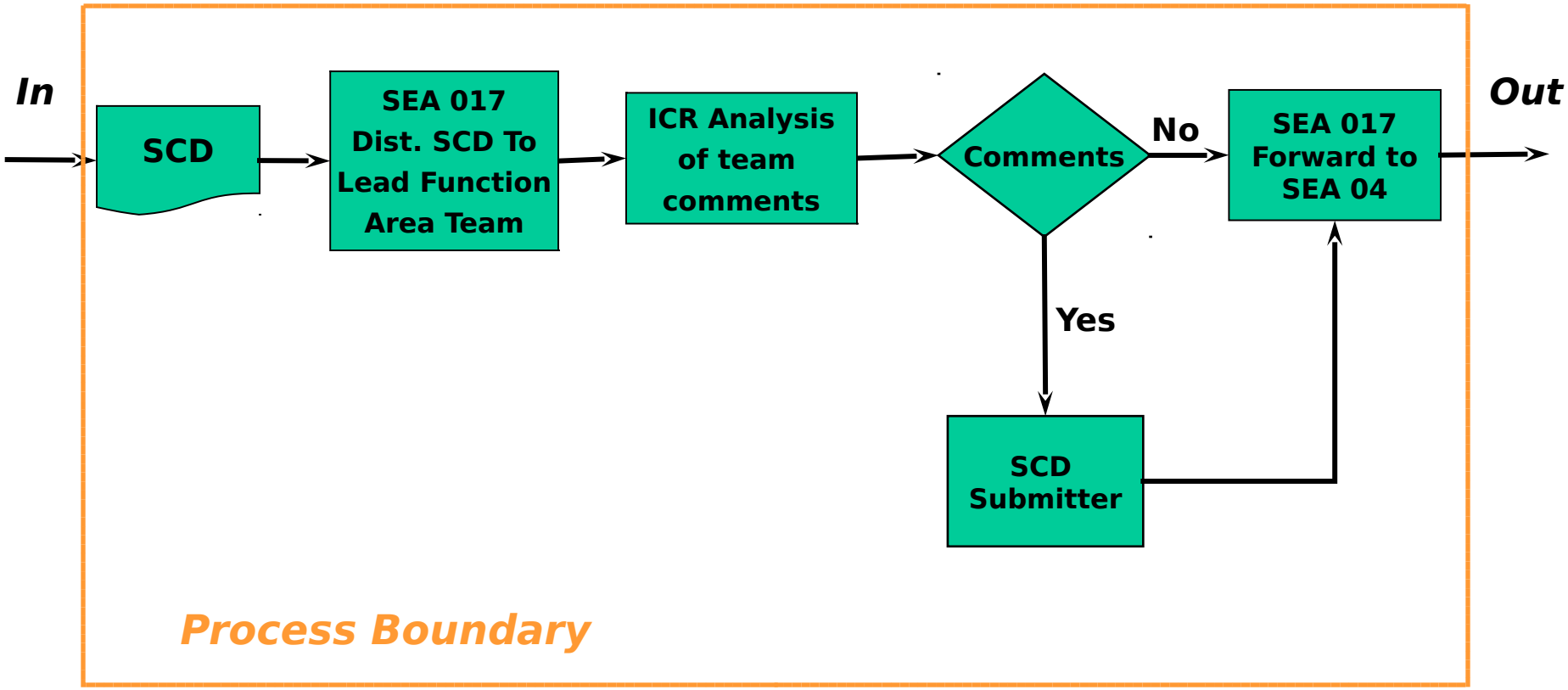
19 Capabilities

CBA Overview

CBA Process Flow, Blks 40/120/200



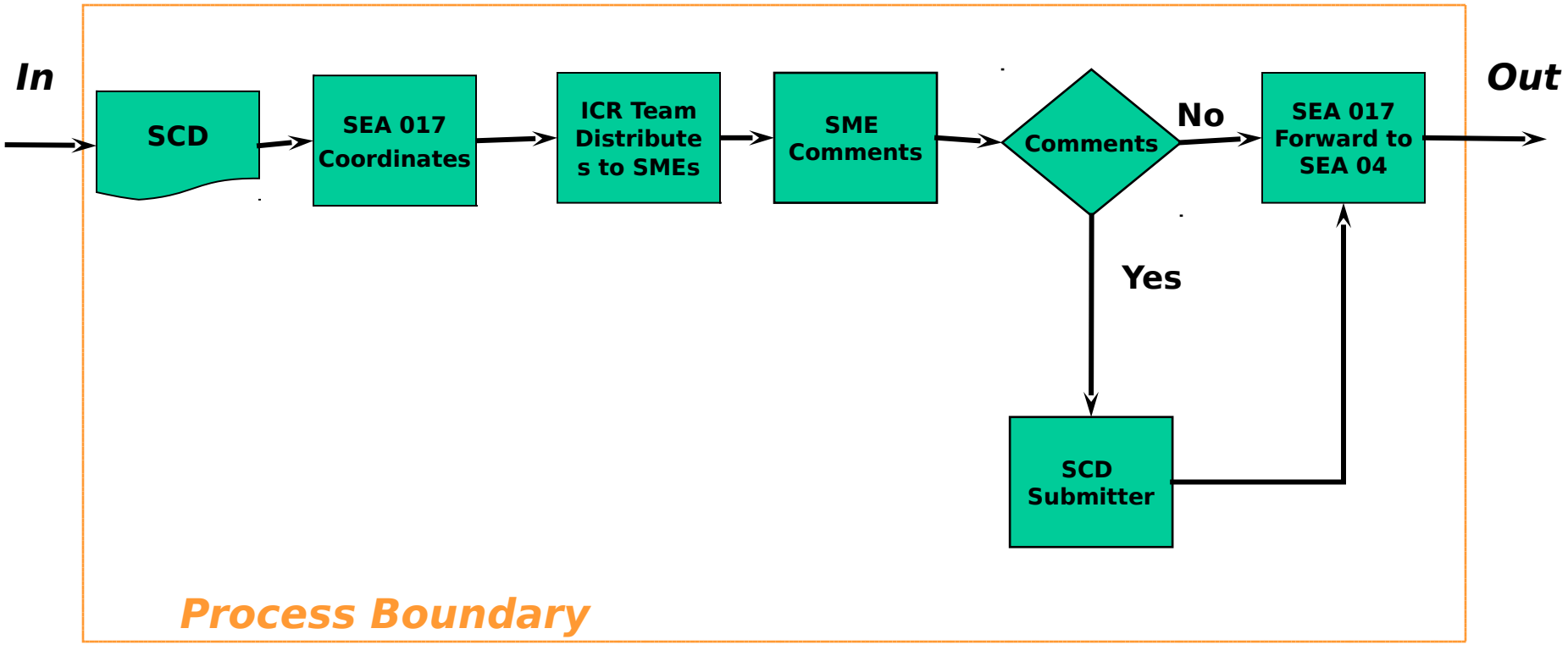
Cost Benefit Analysis (CBA)
Box #40 - Level 3



Process Cycle Time
2 - 3 Working Days

Ref: 3049aUS

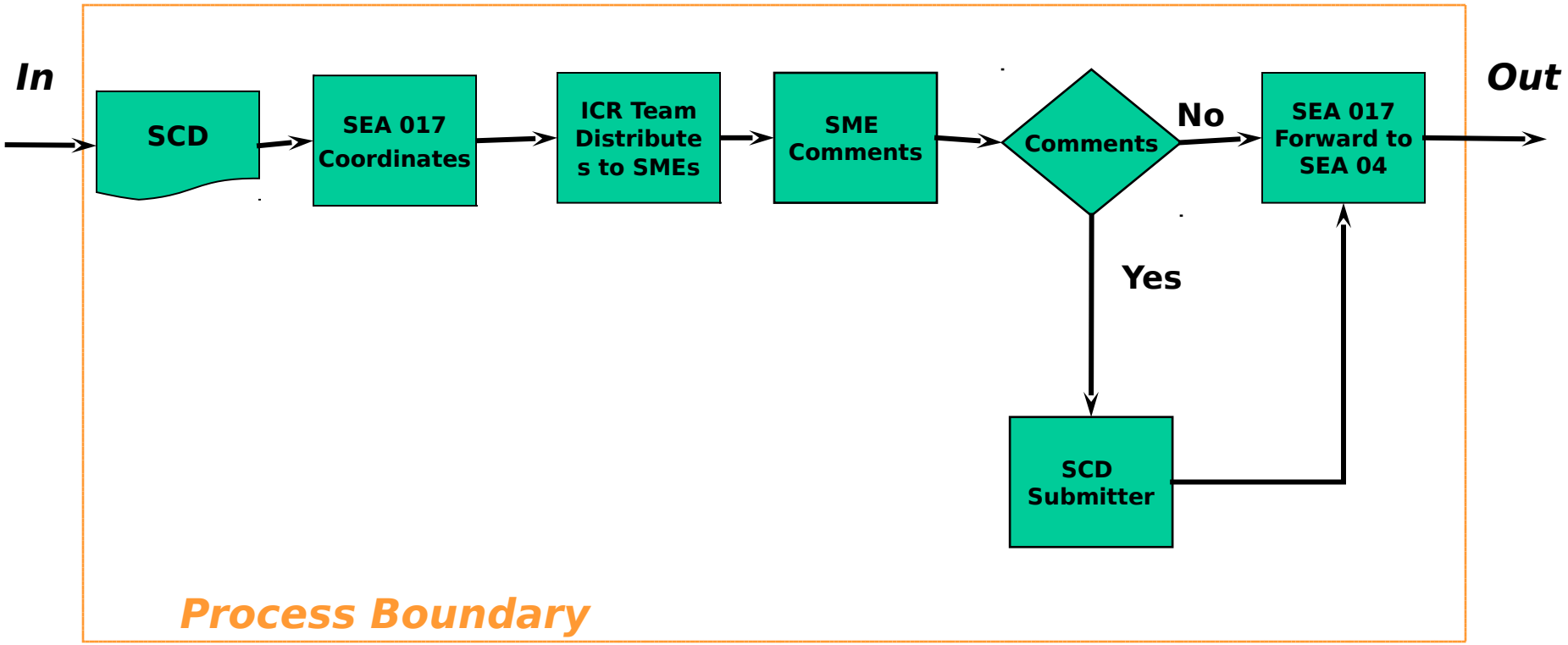
Update Cost Benefit Analysis (CBA)
Box #120 - Level 3



Process Cycle Time
7 – 10 Working Days

Ref: 3049aUS

Update Cost Benefit Analysis (CBA)
Box #200 - Level 3



Process Cycle Time
7 – 10 Working Days

Ref: 3049aUS

NAVSEA 017 (3 FTE)
SHIPMAIN Independent Cost Review Team
Coordinator, HM&E Area Lead, CS/C5I Area Lead

- **SHAPEC (7 ½ FTE)**
  SUPSHIP/SY

- **Norfolk – (2 FTE) CV/CVN/LHA/LDH/AS**
- **Newport News – (1 FTE)**
- **Jacksonville – (1/2 FTE) FFG**
- **Portsmouth – (0 FTE) DD963**
- **Puget Det Boston – (1 FTE)**
  LPD/LSD/LCC
- **Puget – (½ FTE)**
  MHC/MCM/AOE/ARS
- **Bath – (1 ½ FTE)**
- **Gulf Cost – (1 FTE) CG**

- **SPM/PEOs/Software**
  (4 ½ FTE)

- **PEO Carriers**
- **ILS/HIS/Topside – (2 FTE)**

- **PEO Ships**
- **ILS/HIS/Topside- (2FTE)**

- **Software – 1/2**